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THE
JOURNAL OF APPLIED PSYCHOLOGY

VOL. II SEPTEMBER, 1918 No. 3

MENTAL TESTS OF A GROUP OF EMPLOYED MEN SHOWING CORRELATIONS WITH ESTIMATES FURNISHED BY EMPLOYER

By JESSE KNOWLTON FLANDERS, Oakland, Cal.

This study is a unit of a larger problem in which the writer has interested himself. The object of the larger problem is to discover possible ways in which intelligence tests may be of service both to schoolmen and employers for the better placement in vocations of those who are to do the world's work. The Stanford-Binet Scale, which was used in the present investigation, is the outgrowth of several years of painstaking effort by a number of psychologists in an attempt to perfect a means by which to measure native intelligence. Many of us believe that this has been a wise expenditure of time and effort. Nevertheless a large amount of careful work remains to be done, both in the improvement of current intelligence scales and in the determination of their practical value. The worth of the Binet scale, and of similar scales, has already been demonstrated in the care of various types of defectives and delinquents. It has also been shown that the scale can be made of invaluable assistance to the school-administrator in the better grouping of pupils according to ability, particularly in discovering the exceptionally gifted and the exceptionally limited. When all due credit is given, however, to those who have done notable pioneer work along these and kindred lines, the fact remains that we are very much in the dark as to the extent to which, and the manner in which, intelligence tests may be of service in the solution of complex sociological problems which hinge, in part, upon the native abilities of various social and occupational groups. In the

hope of establishing a wider field of service for intelligence testing, a series of studies was planned by the writer which would involve the testing of several groups of adults in various types of commercial and industrial lines, these groups to include individuals of every occupational status from those whose work is of non-skilled and routine character up to and including the professional classes. The main purpose throughout was to determine the degree of correlation between intelligence and success in the various vocations. It was hoped that the information to be gained would prove serviceable both for the vocational counselor in the school and for the employment manager in the industry.

The study here reported is only a beginning. It was made possible through the courtesy and co-operation of the superintendent of a large express company who provided a quiet room for the conducting of the tests and arranged to have his employees come there one at a time throughout the working day. Forty-seven were tested, most of whom were rated as clerks, although the group included a few drivers, collectors and loaders. The men were selected under the direction of the superintendent, the only restriction to his freedom of choice being that he should pick those concerning whom he would be able to give the desired additional information and that he should not pick anyone who had not been in the employ of the company for at least a year. This last restriction was violated in seven instances; three men had been with the company eleven months each, one for nine months, one for eight months, and two for six months each. By these restrictions, however, the large class of "floaters" was eliminated, as the median length of service was five years. It is believed that the group is fairly representative of that portion of the organization which was considered and of the men who may properly be regarded as permanent employees.

The seven following qualities were chosen for comparison:

Intelligence
Accuracy
Speed
Co-operativeness in execution of work
Loyalty to employer
Dependability
All-round efficiency

Each man was classified independently by three of his superiors in each of these qualities according as they regarded him as,—Very Superior, Superior, Average, Inferior, Very

Inferior. These estimates were afterwards transformed into a numerical value on a scale from 5 to 1 and the three estimates combined to derive a final score. This made a possible variation in score from 15 to 3 in each quality. As a matter of fact, the variation was only from 15 to 8, due to the reluctance of those estimating to classify any employee as either inferior or very inferior. This reluctance was probably justified in view of the fact that these employees had survived the weeding-out process which had eliminated many "unfit." It served, however, to reduce the spread in the estimates and doubtless rendered the correlations somewhat less reliable than they would have been if definite instructions had been given for all of the men to be arranged in rank-order regarding one particular quality, and this procedure repeated for each of the other qualities. Had this been done, there would have been a stronger incentive for those judging to compare each man very carefully with his associates and at the same time the offending terminology would have been avoided. The classification which was used has been repeatedly and successfully used with school children. The two situations, however, are quite different. A school teacher has no reluctance in confidentially classifying as very inferior a pupil for whose presence in her classroom she is in no way responsible, while an employer regards it as a reflection upon himself to admit that he has retained the services of one who could be so classified in any of these fundamentally desirable qualities. The information regarding the salary received by each man was furnished by the superintendent; the other information used in deriving the correlations of table No. 1 was obtained directly from the subject himself at the time of the testing.

The correlations were found by the Pearson formula. The occupational status of the father was determined by Taussig's classification. In computing the intelligence quotient the actual age above 16 years was disregarded. The range in actual age was from 55 to 19 with the median at 30.

Most of the correlations are low. Perhaps the two most interesting findings of this study are, that intelligence, as measured by the test and expressed in I.Q., shows such a slight correlation with salary, and that the correlations between it and dependability and loyalty, while small, are actually negative. It was thought that salary would be the best measure of all-round efficiency obtainable, and that efficiency would be largely determined by original endowment, chiefly by native intelligence. But it appears that there are factors more important than intelligence in the ultimate determination of

TABLE NO. 1

	I. Q.	School Grades Completed	Occupational Status of Father	Salary	Intelligence Rating	Accuracy	All-round Efficiency	Length of Service	Speed	Actual Age	Cooperativeness	Dependability	Loyalty
I. Q.	——	.44	.35	.13	.05	.03	—.02	—.04	—.05	—.12	—.15	—.21	—.22
School Grades Completed	.44	——	.37	.08	.03	—.04	—.11	—.10	.01	—.13	—.14	—.18	—.21
Occupational Status of Father	.35	.37	——	—.10	—.04	—.11	—.15	—.19	.06	—.15	—.18	—.29	—.29
Salary	.13	.08	—.10	——	.30	.51	.39	.47	.28	.37	.23	.28	.33
Intelligence Rating	.05	.03	—.04	.30	——	.63	.74	.18	.49	.09	.54	.63	.41
Accuracy	.03	—.04	—.11	.51	.63	——	.74	.20	.47	.20	.55	.74	.48
All-round Efficiency	—.02	—.11	—.15	.39	.74	.74	——	.15	.46	—.03	.67	.73	.56
Length of Service	—.04	—.10	—.19	.47	.18	.20	.15	——	.17	.71	.00	.18	.05
Speed	—.05	.01	.06	.28	.49	.47	.46	.17	——	.07	.38	.39	.42
Actual Age	—.12	—.13	—.15	.37	.09	.20	—.03	.71	—.07	——	.14	.22	.20
Cooperativeness	—.15	—.14	—.18	.23	.54	.55	.67	.00	.38	.14	——	.67	.75
Dependability	—.21	—.18	—.29	.28	.63	.74	.73	.18	.39	.22	.67	——	.56
Loyalty	—.22	—.21	—.29	.33	.41	.48	.56	.05	.42	.20	.75	.56	——

a man's worth to his employer; at least, the man with the highest intelligence may not be the most desirable. In fact, we are led to believe that the men at the upper end of the scale in this group could be replaced by others with less intelligence without any sacrifice of efficiency. The same expenditure of money would thus secure men who would be more loyal and more contented. It should be kept in mind that the correlation between intelligence quotient and salary is of very little importance since the probable error for 47 cases and a correlation of .13 is .096. The range in mental age was from 18 years and 7 months to 10 years, with a median at 15-2; the upper quartile was at 16-7 and the lower quartile at 13-9. (See table No. 2.) Evidently there is a great deal of intelligence going to waste, since the work that these men do is of a routine clerical nature calling for a high degree of accuracy but offering an exceedingly limited opportunity for the exercise of ingenuity or even personal judgment. Success is achieved by the faithful performance of an ordinary task for the doing of which perfectly definite rules have been given. The positions included are known by such names as Accounting Clerk, C. O. D. Clerk, Settlement Clerk, Waybill Clerk, Clerk in Value Room, Clerk in On Hand Department, Clerk in Over and Short Department, Suspense Clerk, Receiving Clerk, Wagon Despatcher, Chief Router. These names indicate a high degree of specialization. The men in the group constitute the rank and file of an organization of 700 employees, from which a small number of supervisors and semi-officials have been eliminated at one end and a large number of "floaters" at the other. They present the typical labor problems of this company.

Why should men with a mental capacity which would enable them to acquire a college education be found doing work exactly similar in character to that which men can do who would never be able to complete in a satisfactory manner the eighth grade of our elementary school? It may be that they are lacking in emotional, moral or other necessary qualities; it may be that economic pressure crowded them out of the schools before they were able to prepare for more exacting service; it may be that the schools did not provide them with proper training; it may be that they selected their vocation blindly and ignorantly. Whatever the reason, there is evidently a big social and economic loss. We have been told that there was no place in our present civilization for the man with eleven or twelve year intelligence. If the findings of this study are verified and are found to hold generally in

TABLE No. 2

DISTRIBUTION OF GROUP BY MENTAL AGE

Mental Age	Number	Mental Age	Number
9–7 to 10–6	1	14–7 to 15–6	11
10–7 " 11–6	3	15–7 " 16–6	8
11–7 " 12–6	0	16–7 " 17–6	6
12–7 " 13–6	3	17–7 " 18–6	5
13–7 " 14–6	9	18–7 " 19–6	1

other industrial lines, we shall need to concern ourselves more with the problem of providing a larger number of jobs suitable for those who can score sixteen or seventeen years on the Stanford Revision, and with the further problem of making available the proper training for such jobs. We know there is a tendency in modern industry to develop what the men cynically call " brainless systems," where one mind frequently directs from 10 to 20 others with such minuteness that the other men closely approximate the moving part of a machine. In such a system the man with limited capacity has come into his own; he can render service to society where the more intelligent man would fail. It is conceivable that we may discover that one of the chief causes of the widespread labor unrest is due to workmen who chafe under a monotonous type of work because their active minds are not sufficiently occupied. We need to know the facts.

Salary correlates most highly with accuracy and next with length of service. If a man does reasonably satisfactory work and remains with the company his salary is increased. One would like to have full information regarding those who have left the employ of the company over a period of years; both those who failed to make good and those who found the service irksome. Those who remained cannot be regarded as peculiarly adapted for just this kind of work since only three expressed unqualified satisfaction with their present position. These three had a mental age below the median for the group. Furthermore, there is no correlation between loyalty and length of service.

We have been taught that additional schooling increases a man's earning capacity; and on the whole that is doubtless true. We have here, however, a concrete case where schooling seems to be of no importance whatever. The range in number of grades completed is from 13 to 3, with the median at 8. One man had finished a year at Annapolis; he was the only one who had gone beyond the high school. There were three others who had completed a high school course. Twenty-three of the group had at some time undertaken a course of

study to supplement their public school training, such as commercial school, correspondence school or evening school. Of these, 12 were above and 11 below the median in mental age; 3 were receiving the median salary, 10 were getting more and 10 were getting less. At the time of the interview there were only four who, in their leisure time, were pursuing a purposeful or systematic course of study in an effort to prepare themselves for a higher type of service.

Three men had a definite ambition to reach a particular position within the organization; 9 had the laudable but indefinite desire to "rise in the ranks;" 18 had ambitions the realization of which would have taken them outside of the organization; 17 would express no definite ambition of any sort and yet only three of them were satisfied. It is so much easier to know that we are dissatisfied with what we have than it is to know exactly what we want. As already stated, only four men were using their leisure time to help achieve their ambition. The most notable case is that of a man who wishes to become a Christian Science practitioner. The seriousness of his purpose is evidenced by the fact that, in order to prepare himself, he has been studying four hours a day for three years. He has a mental age which places him in the upper one-fourth of the group. As he never got beyond the first year in high school it is probable that he has a very meagre equipment of scientific knowledge. A similar case discovered by the writer in another study has caused him to wonder to what extent this condition, of high mental endowment and limited education, accounts for the growth of various pseudo-sciences. Is it not natural for the alert, active mind to demand some sort of problem to grapple with? Certainly we have no right to expect that the conclusions reached by

TABLE No. 3

INTERCORRELATIONS OF THE SEVEN QUALITIES AS ESTIMATED BY SUPERIORS

	All-round efficiency	Dependability	Accuracy	Cooperativeness	Intelligence Rating	Loyalty	Speed
All-round efficiency	—	.73	.74	.67	.74	.56	.46
Dependability	.73	—	.74	.67	.63	.56	.39
Accuracy	.74	.74	—	.55	.63	.48	.47
Cooperativeness	.67	.67	.55	—	.54	.75	.38
Intelligence Rating	.74	.63	.63	.54	—	.41	.49
Loyalty	.56	.56	.48	.75	.41	—	.42
Speed	.46	.39	.47	.38	.49	.42	—

such minds shall always be sane and safe when the thinking has been done in entire ignorance of even the fundamental facts of the physical and biological sciences. This again emphasizes the fact that as a matter not only of conservation, but of self-defense as well, society cannot afford to continue to allow the highly gifted child to become submerged. We must discover him when he first enters school and see to it that regardless of the economic resources of his parents he is given a thorough education.

Table No. 3 shows the correlations between the different qualities as estimated by the judges. It will be noted that these are all high. There is a strong tendency for these qualities to be found together. Speed shows the lowest correlations. It never exceeds .50, while each of the others correlates as high as .74 with at least one of the other qualities.

The correlations between the estimates of one judge and those of another are given in table No. 4. On the whole they are fairly high, but since it is necessary, for the purpose of computing these, to divide the group into two smaller groups, because the same judges did not estimate all of the men, the P.E. is so large that care must be exercised in drawing con-

TABLE NO. 4

INTERCORRELATION IN THE ESTIMATES OF THE JUDGES FOR 19 OF THE MEN

	Speed	Accuracy	All-round efficiency	Intelligence Rating	Dependability	Cooperativeness	Loyalty
A & B...	.80	.42	.33	.18	.51	—.28	—.22
A & C...	.62	.52	.27	.58	.00	.28	—.36
B & C...	.50	.75	.31	.00	—.20	—.17	.71

INTERCORRELATION IN THE ESTIMATES OF THE JUDGES FOR 28 OF THE MEN

D & E...	.67	.57	.40	.55	.15	.52	.33
D & F...	.52	.47	.29	.70	.16	.41	.50
E & F...	.46	.38	.38	.21	.39	.49	.13

clusions from them. The closest agreement appears in speed and the least in loyalty. B and C have a very high correlation in their estimates of loyalty while each of them has a negative correlation with the estimates of A, which makes it evident that their standard was very different from his. If we combine their ratings and also those of D and F of the other group and then correlate the score thus obtained with I.Q., the result is a correlation of —.39 instead of —.22 which had previously been obtained. The correlation between the estimates of A and the I.Q.'s for the small group is only .10 which is of no significance since it is less than the P.E.

Before beginning the test the writer talked from five to ten minutes with each man, gaining his confidence, putting him at his ease and getting the information concerning parentage, schooling, etc., which was used in making the correlations. In a number of cases an estimate was made during this talk of the man's mental age. While most of these estimates were reasonably accurate, they were, in two instances, so wide of the mark as to confirm the writer in his conviction that he would make a poor disciple of Dr. Katherine Blackford!

Subject No. 47 is 24 years old and of Portugese parentage. He has a pleasing manner and good address and was estimated as having a mental age of 15. He reached the eighth grade after ten years of study but did not finish it. He was 16 when he left. He began work with the express company as a wagon driver. In the eight years he has been with them he has held a dozen different positions and made a good record in every one. He is now Receiving Clerk at the company's main depot. Packages are delivered to him for shipment to every part of the United States. He looks up the rate, proper routing, train connections, time required in transit, rules for crating, etc., whenever these are required by the shipper. He is exceedingly scrupulous about following directions and will never vary from them upon his own initiative. He is thoroughly reliable. He has an ambition to become an agent in a small place and will doubtless receive such promotion in the near future. In the test, which occupied one hour and fifty-five minutes, he earned a mental age of 9-2. Four months later, at the request of the writer, he was given the same test by Dr. Kohs. On this retest, giving him the benefit of every possible doubt, he earned a mental age of 10-5. At the same time Dr. Kohs gave several performance tests which, while they have not been carefully standardized, gave added evidence that this man has a mental equipment not above that which is normal for an average ten-year-old boy. He is earning $90 a month and doing a type of work which makes him a very useful citizen. He illustrates the necessity for the distinction between intellectual feebleness and social feebleness which has been frequently pointed out by Dr. Terman. This man is definitely limited intellectually, but he can not be classed as feebleminded in any reasonable sense of that term.

Subject No. 3 came to the test immediately after No. 47 and was estimated as having a mental age not above 13; he earned one of 18-6. He was born in England, of English

parentage. He is 36 years old and has been in the United States four and a half years, having been with the express company all of that time. He is a helper to the C. O. D. Clerk and a very faithful employee. Previous to coming here he worked with his father, who is a grain merchant. He attended University College, London, for a year and refused to return because of a feeling of friendlessness. He had won first rank in a preliminary examination and if he had taken the major examination would very likely have won a scholarship that would have paid his expenses at either Oxford or Cambridge. As a boy he was extremely nervous; frequently got up at night to look for someone he believed to be in the room. His manner is retiring and unresponsive. There is very little expression in his face. He is very conscious of a speech impediment which, however, he has now quite largely outgrown. What a lot of needless suffering he would have been spared if he could have had, when young, the training which would have remedied this defect! Moreover, we cannot estimate the increase in value of his service to society which this might have meant; for it was precisely the consciousness of his defect that was the underlying cause of his feeling of ostracism while at school and which, directly or indirectly, has doubtless affected also his whole subsequent career.

Brief mention will be made of two other cases. Subject No. 11, who is 55 years old, of Scotch-English parentage, earned a mental age of 16-11. He left school at the end of the 8th grade, has been with the company 34 years, and for the past five has been a Money Clerk. He is spoken of as being supersensitive, jealous and quarrelsome with his superiors. He will probably never be promoted. Subject No. 41 is 25 years old, American with English-German antecedents. He earned a mental age of 13-6; left school at the end of the 4th grade and has done no additional studying since. He stated that he had an ambition to become a mail clerk, but was doing nothing definite towards achieving that end. He has been with the company five years. He has received an increase in salary of $20 per month in less than a year and is being considered at the present time for further promotion. He was referred to as one of the most promising of the group.

VARIABILITY OF THE EDUCATION OF UNEMPLOYED MEN[1]

HERBERT A. TOOPS and RUDOLF PINTNER, Ohio State University

During the past two years the writers have collected a large amount of data in regard to the final educational attainments of unemployed men. From these data has been derived evidence to point to the probability that education, wages, and industrial success are in large degree dependent upon the intellectual ability of the men. With the records at hand and a knowledge of the changing conditions in industry during the two years, it is now desirable to investigate the relation of education to the type of men applying at any particular time or season, and under different industrial conditions,—in brief, the changes in the educational attainments that may be noticed in an employment office over a period of time.

This report deals with the results obtained from the records of the applicants for positions at the Dayton, Ohio, Free Employment Office during the years 1916 and 1917, giving a more complete analysis of the results for the latter year. A tabulation by grades and by months was made of the "grade at leaving school," as reported on the registration cards of the 7,020 newly registering applicants who reported this item in 1916, and of the 9,506 new applicants who reported the item satisfactorily in 1917.

We at first wish to know whether the educational attainments of the applicants as a whole have changed during the period under consideration. If we make the assumption, merely to have some substantial basis upon which to make our calculations, that a grade "8" as reported means eight grades completed, then the median grade at leaving school will probably best give the desired information. We also wish to know whether there has been any change on the whole in the type of men as to education, whether more or fewer men of high and low educational attainments respectively applied in the one year than in the other, and finally, if any

[1] The writers wish to acknowledge their indebtedness to Mr. Eugene A. Mead, Superintendent of the Dayton State-City Free Employment Office, without whose cooperation and encouragement this report would not have been possible.

TABLE I. GENERAL COMPARATIVE RESULTS OF THE EDUCATIONAL ATTAINMENTS OF THE DAYTON FREE EMPLOYMENT OFFICE APPLICANTS FOR THE YEARS OF 1916 AND 1917.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number of Cases:													
1916	675	598	470	603	639	580	570	627	544	513	606	595	7020
1917	609	343	472	555	818	941	1287	1152	682	699	848	1100	9506
Median Grade at Leaving school:													
1916	8.23	7.89	8.27	8.15	8.14	8.31	8.40	8.32	8.30	8.43	8.35	8.28	8.28
1917	8.17	8.26	8.12	8.28	8.28	8.21	8.28	8.31	8.26	8.34	8.36	8.37	8.30

change is noted, we wish to know more about the changes and the men causing the changes.

Table I shows the number of men reported upon by months and the median educational attainments of the applicants by months for the two years.

We note that, in spite of the fact that the total number of reporting applicants increased by about 26 per cent in the second year and that for particular months the percentage of applicants in 1917 was about twice that of 1916 due to unusual industrial conditions, the median attainment in education for the two years is almost the same, 8.30 grades of school completed by the 1917 applicants as compared with 8.28 grades by the 1916 applicants. If we consider the monthly medians, we note but little change in these also. Even the greatest of the differences could be produced by the shifting of about a dozen men from one extreme of the distribution to the other. Such stability of the central tendency is characteristic only of distributions which have a very fundamental property of humanity as an underlying basis. About all that one can say of the slight amount of variation which is probably significant, is that in general the medians are lower in the winter and spring months and higher in the summer and autumn months than the average grade for the entire year. During the summer and autumn months of 1916 the office placed many skilled mechanics in positions in munition factories and also many mechanics who were out of jobs because of a strike; yet the large number of these presumably better educated men did not raise the median of the group to any appreciable extent. In the summer of 1917 the office was called upon to supply many men, of whom many were skilled, to the aviation construction camps and to the army cantonment construction camps; and again the monthly medians are not affected to any great extent. Then in the fall months of 1917, a change in the attitude of employers towards the office was effected. The office had proved itself so efficient in securing good men during the summer months that the large manufacturers of the city mutually agreed to stop all advertising for employees and rely entirely upon this office for their new employees. Yet in the fall and winter months of 1917 we note but little change in the monthly median attainments although the median does seem to be on the upward trend. The policy of this office has been in the past to discourage the applications of undesirable men and to encourage the applications of high-grade men. Why, then, with the large increase in number of high grade men that is known to exist in 1917, do not

the median educational attainments of the group change more appreciably?

To answer this question it is necessary to study intensively the distributions of the men by the grades at which they left school and by the different months of the year. We must determine the changes that have gone on from month to month and note whether there is an increase or decrease of poor, fair and well educated men as time goes on. An examination of the crude number distributions by grade and by month of registration can give us no clue to the information which we are seeking. Such a distribution table is too lengthy to be given here. It is readily apparent that the crude numbers can have no value for us unless taken in connection with the total number of applicants during a given period of time under consideration. To illustrate: If the number of applicants who had a second grade education and who registered and reported their education during May was *twice* as great as the number with second grade education who registered in April, but the total number of applicants in May was only *half* of the number registering in April,—then the relative increase of the number with a second grade education in May over the number with second grade education in April is 300 per cent, and not 100 per cent as given by the crude numbers; or, the ratio we desire is *four* and not *two*. We can then say that the number of second grade applicants has relatively increased to four times the number in April. The ratio desired for our comparisons, then, amounts to dividing the number of applicants in a given month with a given amount of education by the corresponding number which is to be expected in that month when the total increase of that month over the preceding month is taken into account. It can be easily shown that what this amounts to mathematically is dividing the per cent with the given grade of education at the particular month under consideration by the percentage at the same grade for the preceding month or for the time period with which it is to be compared.

If, NJ[2]=the total number of reporting applicants in January,
NF=the total number of reporting applicants in February,
nJ=the number of second grade applicants in January,
nF=the number of second grade applicants in February,
then the number of second grade applicants in February, if there were no relative increase or decrease of second grade applicants, who

[2] The italicized letters indicate modifiers, not algebraic factors.

are expected by reason of the change in the total number of applicants in the two months, is

$$EF = \frac{NF}{NJ} nJ$$

But usually nF is not equal to EF (the number to be expected) for the reason that there is some relative change in the numbers in the two months. Our ratio, or index of comparison of the number of second grade applicants in February with respect to January, then, is,

$$I = \frac{nF}{EF},$$

or,

$$I = \frac{nF}{\frac{NF}{NJ} nJ} = \frac{nF \quad NJ}{NF \quad nJ}.$$

We may write this expression in the following form,

$$I = \frac{nF}{NF} \div \frac{nJ}{NJ}.$$

The index of comparison of the number of second grade applicants in February to the number of second grade applicants in January is thus the quotient obtained by dividing the per cent of such applications in February by the corresponding per cent in January.

When this index is 1.0, there is no relative change; when the index is less than 1.0, there has been a relative decrease, and when the index is greater than 1.0 there has been a relative increase of second grade applicants in the second month with respect to the first. An index of 1.20 in the above case would mean that the second grade applicants in February had relatively increased 20 per cent over the number of such applicants in January.

We have then but to reduce the grade distributions to percentages and divide the percentage in the second period at any given time period by the percentage in the same grade at any preceding period with which we wish to compare it. The index has the value, which a comparison directly of the crude percentages has not, that equal gross differences, say at the first and eighth grades, are shown in their true perspective as regards the per cent of relative change. One per cent of gross difference in the first grade is a much greater relative change than one per cent gross change at the eighth grade, because the actual percentage upon which the relative change is based is much larger in the eighth grade than in the first grade.

If we reduce our distribution table of percentages to these index numbers, we get a result that is almost as bewildering as at first, so far as being able to understand the changes that have taken place in the composition of the group. Accidental or chance changes in the gross numbers by months and by grades play a large part in the determination of the index

TABLE II. NUMBER AND PERCENTAGE DISTRIBUTIONS OF 1917 APPLICANTS BY GRADE GROUPS AND BY SEASONS OF THE YEAR

Grade Group	Numbers—						Per Cents—					
	Jan. Feb.	Mar. Apr. May	June July Aug.	Sept. Oct. Nov.	Dec.	Total for Year	Jan. Feb.	Mar. Apr. May	June July Aug.	Sept. Oct. Nov.	Dec.	Total for Year
None, 1, 2.....	48	94	129	89	39	399	5.05	5.09	3.82	3.96	3.55	4.23
3, 4.....	84	154	251	162	69	720	8.83	8.35	7.34	7.26	6.27	7.56
5, 6.....	178	330	596	383	179	1666	18.71	17.88	17.55	17.02	16.28	17.52
7.....	102	205	368	219	116	1010	10.72	11.10	10.87	9.82	10.54	10.62
8.....	305	585	1118	804	396	3208	32.07	31.70	33.08	36.70	36.00	33.74
I.....	70	171	319	173	102	835	7.35	9.28	9.44	7.76	9.28	8.78
II, III, IV.....	143	256	502	333	174	1408	15.05	13.88	14.85	14.80	15.82	14.83
A, B, C, D, E...	22	50	97	66	25	260	2.36	2.75	2.87	2.94	2.28	2.73
Total.....	952	1845	3380	2229	1100	9506	100.14	100.03	99.82	100.26	100.02	100.01
Median G.....	8.21	8.26	8.31	8.33	8.37	8.30	—	—	—	—	—	—
1916 Median....	8.23	8.16	8.34	8.36	8.28	8.28	—	—	—	—	—	—

TABLE III. INDICES FOR COMPARISON OF GRADE GROUPS BY SEASONS OF THE YEAR

GRADE GROUP	INDEX FOR SEASON —					Total for Year
	Winter	Spring	Summer	Autumn	Winter	
None, 1, 2	1.00	1.01	.76	.78	.70	.84
3, 4	1.00	.95	.83	.82	.71	.85
5, 6	1.00	.96	.94	.91	.87	.94
7	1.00	1.04	1.01	.92	.98	.99
8	1.00	.99	1.03	1.14	1.12	1.05
I	1.00	1.26	1.28	1.06	1.26	1.19
II, III, IV	1.00	.92	.99	.98	1.05	.99
A, B, C, D, E	1.00	1.17	1.22	1.25	.97	1.16

TABLE IV. PER CENT OF RELATIVE INCREASE OR DECREASE OF GRADE GROUPS OVER THE CONDITIONS PREVAILING AT THE BEGINNING OF THE YEAR, BY SEASONS OF THE YEAR

GRADE GROUP	PER CENT OF INCREASE OR DECREASE					Total for Year
	Winter	Spring	Summer	Autumn	Winter	
None, 1, 2	0	1	—24	—22	—30	—16
3, 4	0	— 5	—17	—18	—29	—15
5, 6	0	— 4	— 6	— 9	—13	— 6
7	0	4	1	— 8	— 2	— 1
8	0	— 1	3	14	12	5
I	0	26	28	6	26	19
II, III, IV	0	— 8	— 1	— 2	5	— 1
A, B, C, D, E	0	17	22	25	— 3	16

numbers. We have made the meaning of the changes more readily apparent by the following procedure. The table of distributions was regrouped by adding together several grades of low frequencies and then grouping these frequencies into still new groups on the basis of the seasons of the year. By this procedure, accidental changes in the distributions are so averaged that their effect is practically negligible. These frequencies, both in numbers and per cents are shown in Table II. The upward trend during the year is then clearly apparent by the medians alone.

If we take the percentage frequencies of the winter months, January and February together, to represent the conditions at the beginning of the year and compare all the other percentage frequencies with these, by the method above described, we get the indices of Table III. Since these indices may be taken to represent the relative percentages which each period is of the conditions prevailing at the beginning of the year, we have but to subtract 1.00 from each index to get the per cent of relative increase in a particular group of grades throughout the year (Table IV). Thus, if we subtract 1.00 from the index for the summer months (June, July, August) in the eighth grade, we find that the eighth grade applicants in the summer months have relatively increased by 3 per cent over the eighth grade applicants in the winter months of January and February together. A negative percentage in the table means a decrease.

Now let us see how these last two tables help us to understand the relation of education to the kind of applicants applying at different times and under different industrial conditions. We at once note from Table IV the relative decrease throughout the year of all men with education less than an eighth grade education, as is shown by the negative signs. The eighth grade and I-year high school men are rapidly increasing in relative importance. From Table III we note that, for the whole year, the 7-grade men and the II, III and IV-year high school men together have made but little change while there have been large gains made in the relative percentages of the eighth grade and I-year high school men and College Men (A, B, C, D, E). The two most significant relative increases are in (1) the eighth grade, which has the largest gross total of applicants of any grade and in which small relative changes mean large changes in gross numbers and (2) in the I-year high school. The relative increase in the College applicants is not so important for the reason that the group has a rather small gross number in it. We also

note that the rate of relative decrease of the lower grade men is seen to slow up with the approach of the winter months.

We may derive several conclusions from the above figures. With the changing of the attitude and policy toward the office and the calls made upon it to send out skilled workers in larger and larger numbers, we note that there is a decided increase in the relative proportion of eighth grade and I-year high school men, a fact which means that there is a relatively large gross number of these men applying at the end of the year as compared with the beginning of the year. To make up for the increase in these two grades we have then consistent decreases in the relative importance of the men of lower grades, the largest relative decreases being in the case of the men with least education. What that means from an industrial standpoint, since the number of men actually hired by employers bears a rather constant relation to the type of applicants, is that where given the chance to choose their employees from men of all degrees of education, employers are choosing their men with the better education wherever possible. If we regard the number of men in the lowest grade group (no school, first and second grades) in Table II we note that the gross numbers of these poorly educated men decrease but little, although they show a tendency to increase with the approach of winter or at least to decrease at a slower rate than in the summer months. What this probably means is that the places which they might have held in the industrial world are being taken by better educated men, and that they still keep on applying at the office for work, since their number does not decrease to any great extent although their relative importance is decreasing. The men with little education are thus a rather stationary class. We have good reason to believe that these are often men who are mentally incompetent, and that whatever makes for mental inefficiency makes also for educational and industrial inefficiency. Consequently these men are last to be hired and first to be thrown out of jobs when the employer has the choice between poorly educated men and the better educated men. The choice exercised by the employer is not made because of the poor education but because of industrial inefficiency. Indeed, the test administered by the employer is not the amount of education of the applicant but an industrial test,—whether or not the applicant is able to do the work for which he is to be hired. Lack of education and industrial inefficiency are thus probably both a result of poor intellectual endowment. That the men of poor education are relatively more numerous in the winter than

in the other seasons is no doubt due to the fact that such men, when employed, work at such work as can be carried on during the spring, summer and autumn months only. Industry, too, is usually more active during these periods so that there would be a greater chance for some of them who had rather a poor education but a fair amount of intellectual endowment to obtain jobs in competition with men who are better endowed intellectually and are generally better educated. It is not, of course, maintained that poor education is always found only among poor or undesirable workers, but in general this would seem to be true.

The lower grade men are decreasing in relative importance but not greatly in actual numbers. The eighth grade and I-year high school men, *i.e.*, those around the median educational attainment, have increased both in numbers and relative importance. There is a decrease in the relative importance of the men of the last three high school grades with but little change in the absolute numbers. These three facts then are sufficient to explain why the median attainment has changed so slightly. The median deviation of the 1917 distribution is less than that of the 1916 distribution; the cases are grouped more densely about the median. The men from the last three high school grades, while being perhaps even more desirable employees, are few in number in the community and so cannot change the median attainment to any very great extent even if all were included. Of the few who are in the community, most of them are probably permanently employed and so do not have occasion to come to the employment office. Consequently then, if all employers of the city were to demand only better educated men, they would have to recruit most of them from the seventh, eighth and I-year high school men.

Such distributions point to a very fundamental principle underlying not only education but industry as well. All people of a population (industrial workers and otherwise) have varying intellectual endowments, which are distributed according to a curve of normal distribution, and which influence the industrial success and school attainments of the population to just about that degree in which the respective degrees or measures of mental endowment are found to occur.[3] Since, considering all the working population, the frequencies of these degrees of mental endowment do not change, *i.e.*, are heredi-

[3] Pintner, R. and Toops, H. A.—Mental Tests of Unemployed Men. *Journal of Applied Psychology*, Vol. I, No. 4, 1917, pp. 325-341.
And also, by the same authors, Mentality In Its Relation to Elimination from School. *School and Society*. To appear shortly.

tary and hence change very slowly, if at all, in the general population,—we should expect the median amount of education at any time to approach to a constant value; and we should expect the education of any industrial group to be made up of different proportions of men of the respective amounts of education according to the amount of competition for positions, and the possibilities of employers choosing their men from all possible grades of men. The employers choose, whenever possible, the better educated men not because of their better education primarily, but because of their better intellectual endowments which enable them to make better adjustments to their work. This, in turn, makes them more satisfactory employees.

AN EXPERIMENT IN INFANT EDUCATION

Introductory Statement

By Lewis M. Terman, Stanford University

The following article was written at my urgent request by the father of Martha. The statements it contains border so closely on the incredible that I have thought best to state here briefly what I know about the child.

Martha lives within a few miles of Stanford University. Her father is a lawyer, having graduated from Stanford University at the age of 21 years. The mother was a teacher before marriage. I first saw Martha on the evening of March 31, 1918. At that time she was a few days more than 26 months old. Several times I had heard of her as a child prodigy who was able to read like a school child. On the day just mentioned Martha's father brought her to my home and allowed me to observe her reading ability. Her performance was quite beyond anything I had deemed possible for a child a little more than two years old. She read from any primer fluently and with better expression than most first grade children are capable of. Her pronunciation, however, was babyish as one would expect in the case of a child who had only talked one year. Given primers which she had never seen, she read from any starting point without hesitation. Whenever she came to a word she did not know she said, "What's that?" In one little lesson she was given to read, four new words were encountered and pronounced for her. An hour later she was able to recognize all of these even when they were shown to her in word lists at the back of the book. I did not undertake to measure her reading vocabulary, but from what I heard of her reading I am convinced that it is larger than that of the average child who has spent ten months in the first grade.

I have known Martha's father for approximately three years and I wish to say that his statements in the following article should be accepted without the slightest discount for paternal pride or faults of observation. He has made the article a plain statement of fact, leaving each reader to interpret the interesting phenomenon according to his own theories.

One other pertinent fact should be mentioned: Martha's

oldest brother, 11 years old at this writing, has the highest intelligence quotient I have found among California children. At nine years he tested 171, and a year later 172. At 11 years he is leading his class in the eighth grade. This boy was given a course in intensive mind culture similar to that employed in the case of Martha, only not so early in life. In his fourth year he could read various primers and at the age of six he devoured books which are ordinarily not read by children below the fourth grade. There is one other child in the family, a boy two years younger than John. This boy is making an average record in the third grade and seems to be little if any more advanced in intelligence than the average child of his age. This boy enjoyed no special instruction like that given the other two children for the reason that the father at that time was fully occupied by professional duties.

It is interesting to conjecture to what extent the precocity of John and Martha was due to the educational stimulation they received, and to what extent the average condition of the other child is the result of the omission of such stimulation. The question can here only be raised; but it is within the possibilities of psychology to find, by properly controlled experiments, an answer to this and similar questions relating to the plasticity of the human intellect. Is it too much to hope that the experimental psychology of the future will concern itself more with the dynamics of mind and character than it has in the past?

By Martha's Father

Up to the age of nineteen months my daughter, Martha S., was apparently a normal child mentally and physically. She began to talk and to walk at the usual age and her progress in these particulars was neither more rapid nor slower than that of the average child.

At the age of about fourteen months she had acquired the use of her first three words, "mamma," "papa," and "pretty." I then began an experiment in child education which has continued, more or less intermittently, up to the present time. I had heard of certain infants who showed great precocity at early ages, and was moved by curiosity to attempt to discover for myself whether such children are specially gifted by nature with unusual mental powers or whether the same development might not be attained by any normal child such as Martha appeared to be.

I had no access to any of the literature on the subject, and, indeed, up to the present time have not read any book or article dealing with cases of early mental development and

the methods employed to secure it; nor have I ever been a teacher or particularly interested in educational matters. The results obtained, therefore, have naturally been limited by the fact that I was a rank layman pioneering in a field to me unknown, without knowledge of educational methods and compelled to rely upon such crude expedients, in lieu of methods, as might suggest themselves to a lay mind. In view of the measure of success which has attended an experiment undertaken under such obvious disadvantages, it is safe to assume that had the same experiment been carried out consistently and uninterruptedly by a qualified educator, the success would have been proportionately greater.

As an initial step I cut from red cardboard a number of large capital letters and tacked them on the living room wall among the various pictures hanging there. In moments of leisure I took Martha in my arms and walked from picture to picture naming the objects represented. Occasionally I stopped before one of the letters and said "See pretty B," "There is O," or "See M," as the case might be. In a few days she was able to recognize B, and her fourth spoken word was "pretty B." At this time she learned to recognize three or four of the capital letters; but her progress was slow and disheartening, and as spring work on the ranch was coming on, I dropped the experiment altogether. From that time for about five months no special effort was made to direct her mental development, which proceeded normally. I did, however, in spare moments make it a practice to point out various objects and to pronounce their names slowly and distinctly, with the result that her vocabulary of nouns was rapidly increased.

One day when she was about nineteen months old her aunt showed her the pictures in a nursery book, in which she at once became greatly interested, and from that time her mental development has been rapid. While it is doubtless unsafe to generalize from the results of a single experiment of this kind, my experience with Martha leads me to believe that the secret of unlocking the wonderful powers of the baby mind lies in securing its *interested* attention to matters of educational value, and that by far the most effective means of arousing such interested attention is the nursery picture book, properly employed.

I placed in her hands a book which, in addition to a number of pictures interesting to the child mind, contained capital letters in flaring type and colors. She at once became interested in the pictures and fell into the habit of rushing to

me, whenever I entered the house, to have me show them to her. At these times I took her on my lap, turned to a picture, told her what the objects represented were, and chatted about them in such fashion as seemed most to arouse her interest. Occasionally I turned suddenly to the pages of capital letters, pointed to one of them, and exclaimed with feigned excitement, "Oh Martha! Look! Look! There's P!" Then, without giving her time to discover the deceit and to determine for herself that after all there is nothing wildly exciting about the letter P, I returned to the pictures and excited her interest in the vicissitudes of Tom the Piper's son, only to turn back after a few moments and point with an exclamation to another letter. The pictures were unquestionably of great interest to her, and as the references to the uninteresting capitals were only occasional and momentary, the net result of these sessions was that she found the book as a whole a great joy, failed to discover the camouflage in the matter of the letters, and nevertheless became familiar with them. When she was nineteen months and thirteen days old she was able to recognize and pronounce all of the capital letters.

Although I am informed that the method of teaching a child to read by first teaching it its letters is decidedly out of vogue, I nevertheless continued in that error, if error it be, and next proceeded to teach Martha the small letters. As I had no picture book containing the small letters in showy type, I was compelled to resort to another expedient. I drew the letters carefully on the back of business cards, and kept a few of these in my pocket. When she grew tired of looking at pictures I allowed her to play with these cards, of course calling her attention from time to time to the letter on the back of each. She became interested about this time in exploring my coat pockets and pulling the contents out of them, so I sometimes placed a few cards in a pocket open to attack, and allowed her to pull them out one at a time, refusing to let her have a new card until she pronounced the letter on the one already pulled out. As this refusal constituted an obstacle to an interesting investigation, she sensibly surmounted it by observing the letters and pronouncing them in order to experience the joy of delving into the depths of the pocket for a new card. At other times I varied the play by sitting down with a pack of the cards in my hand and giving them to her one at a time to be carried by her across the room and delivered to her mother or aunt, refusing to give her another until she told mother or aunt the name of the letter on each card delivered. Both mother and aunt always dis-

played a highly gratifying interest and astonishment at all information so volunteered by her, and she doubtless felt that she was playing a very important rôle in an extremely important matter. At any rate she enjoyed the process immensely and incidentally learned her small letters.

When she was twenty months old she knew both small and capital letters thoroughly, and I next proceeded to teach her to read. For the initial steps the picture books were again resorted to. In passing from picture to picture I occasionally dropped down to the reading matter, placed my finger under the word "the," and said in a casual manner, "And there is 'the,' Martha," proceeding instantly to another picture before that wholly uninteresting image of a word could detract from the vivid interest aroused by the pictures. In a few days she knew "the" and had no difficulty in picking it out herself in a page of print. Several other words, such as "book," "man," "fat," "boy," and "girl," were taught in the same way. These words were then transferred to the backs of cards and thoroughly fixed in her memory by following out the series of plays used in teaching the small letters.

As I felt that the type in ordinary primers would be too small for a child of her age, and as an examination of a number of these primers indicated that much of the matter related to things beyond her knowledge, I determined to prepare my own primer. I accordingly purchased an ordinary five cent composition book, cut highly colored pictures from magazine advertisements, pasted them in the book, and printed under them simple words referring to the pictures in letters half an inch high.

Her interest in this book was confined almost exclusively to the pictures, the reading matter in itself making no special appeal to her. She wanted to see the pictures; before a page was turned and a new picture brought to view it was necessary to pronounce the words, and she did so as a means to getting to something enjoyable. Of course new words were gradually added on succeeding pages. Although the words were arranged in short sentences she did not at first realize any connection between the words or grasp the idea that these words as combined expressed a thought. Each word was for her a picture without relation to other pictures. When she was twenty-one months and ten days old the idea that these word pictures represented thoughts sudenly dawned upon her while pronouncing the words "I see mamma" written under a photograph of her mother. This discovery was attended by every indication of mental pleasure, and from that moment

she began to read in the true sense of the word. I find from my records that on that day she had a reading vocabulary of thirty-five words and could distinguish between and name the primary colors.

It may be observed that up to this time the process of teaching was one of indirection. No effort was made to interest her directly in characters or words to be memorized. These were, on the contrary, studiously kept in the background, and her attention was directed to them only casually and momentarily from time to time in connection with pictures or matters which aroused and held her interest. In a world overflowing with things interesting to the baby mind it is a difficult task to secure direct concentration on such uninteresting things as letters and word pictures.

The difficulty of securing such direct interest in reading matter now began to manifest itself. With each additional lesson added to the home-made primer the number of words in proportion to pictures increased, and Martha's interest began to decrease in much the same proportion. The reading matter was assuming a prominence which no longer made it incidental to the pictures, but which threatened to make the pictures incidental to it; and as she had not reached the stage where the act of reading in itself afforded pleasure, she began to get suspicious of a book in which interesting pictures appeared only between arid stretches of word pictures. It was now necessary to bridge the difficult gap between this point and the point at which the act of reading would begin to be a pleasure by reason, not of the accompanying pictures, but by reason of the thought conveyed. To that end I resorted to all sorts of expedients, some of them doubtless ridiculous. To encourage her I once applauded her by clapping my hands after she had finished reading a page. That pleased her, and when she finished another page she demanded more applause. Finally it came to be understood that whenever she finished reading a page all present must break out into riotous handclapping. This outburst of applause was so pleasing to her that she began to seek the opportunity of reading in order to provoke it. Often after wading almost through a page and observing that she was within a line or two of the bottom, she would cease reading, look up with eyes dancing with joyous expectation, and exclaim "Pretty soon patty-cake!" (clap). Later on, when handclapping had lost something of its novelty I once became so enthusiastic after she finished a difficult page that I broke out in the chorus of "Marching through Georgia," beginning, of course, with the words "Hur-

rah! Hurrah!" That also tickled her fancy and for a time she read for the purpose of hearing this chorus bellowed by the family at the end of each page. At other times she read for the purpose of being tossed up in the air or of being taken out to see the stars. When all these failed I fell back on rewards and, to some extent, on downright compulsion. Her small allowance of candy was cut off and she was given to understand that she could have candy only by reading for it. If the promise of candy was insufficient to coax her away from her dolls and toys a piece would be placed on the table in plain sight until she surrendered and expressed a willingness to read for it. On a few occasions, when everything else failed, I even resorted to a light spanking to get her started to reading. I mention this fact not because I believe it to be a method to be recommended; but in order to make this record a true one. I now feel that by the exercise of a little more patience and ingenuity I could have surmounted all difficulties by more rational methods. By the time she was twenty-three months old she began to experience the mental pleasure of reading, and the necessity for these methods passed.

Her reading was supplemented with the cards until her vocabulary increased to about seventy-five words. She then began to exhibit an aptitude for assimilating new word forms which rendered further use of the cards unnecessary.

In the reading matter specially prepared for her capital letters were eliminated entirely except in the case of proper nouns. She was reading by the word method in which each word is in effect nothing more nor less than a picture with a given name. Considered as a picture, the picture "the" is decidedly different from the picture "The;" and it clearly confused the child to hear the same name applied to dissimilar pictures. When she was far enough advanced to begin the use of printed school primers she no longer had any difficulty in recognizing words beginning with capitals.

The composition book primer was not wholly satisfactory. Its leaves were of such flimsy paper that in the hands of a baby they were readily torn; and we were obliged to keep it out of her reach except when an older person could be present to watch over it. To obviate this difficulty I procured a sheet of artificial wall-board of the type of "Beaver Board," and sawed it into pieces about nine inches long by seven inches wide, on which the lessons prepared for her were pasted. The boards so prepared were practically indestructible, and served not only as a reading text, but as a toy as well, with which the baby might play at her pleasure. Martha

took kindly to these boards, and when twenty-three months old ordinarily spent as much as an hour each day on the floor, playing with the boards, and reading the lessons aloud to herself. After she had mastered the contents of some fifteen of these boards, had acquired a reading vocabulary of about one hundred and fifty words, and had developed considerable proficiency in reading, ordinary school primers were placed in her hands.

At the age of twenty-four months she had a reading vocabulary of over two hundred words. She is at the time of this writing twenty-six and one-half months old, and has a reading vocabulary of over seven hundred words. In addition to the matter specially prepared for her on the boards, and in addition to considerable matter mastered in various nursery books, she has finished four school primers and is about half way through a fifth. Her vocabulary of spoken words is very extensive, so much so that I have given up trying to keep track of it; but it must be well over two thousand words. Her pronunciation has by no means kept pace with her progress in reading; but her expression while reading leaves little to be desired.

Because of lack of time very little has been attempted in the way of developing her mathematical sense. When she was twenty-one months old she had acquired the use of the words "one," "two," "three," "four," "five," "six," and "seven," but without any concept of the number value expressed by the words. At that age I spent many hours, and exhausted every resource of my ingenuity in an attempt to get her to recognize the number of objects up to three, but without success. She had absolutely no mathematical sense at that age, although her ability to recognize colors and word forms was already well developed. The first glimmering of a mathematical sense appeared during her twenty-third month, when she began to count small groups of objects correctly. By the time she was twenty-four months old she recognized and read the printed numerals up to 100, and correctly counted groups of objects up to ten. No effort has since been made to develop her mind in this direction.

Owing to pressure of other matters I have been able to give her little attention since her twenty-fourth month; and for some time have devoted to her only a half hour or so in the evening two or three times a week; so that her development, considerable as it is, by no means approaches the limits of possibility. Indeed, I am much impressed with the idea that the limits of the baby mind have never been sounded. It

appears to be capable of performing feats beyond the powers of the mind of either the adult or the child of school age. As an illustration, it is no unusual thing for Martha, when conditions are favorable, to cover twenty pages of simple new matter in a primer and add twenty or more new words to her vocabulary in a single session of half an hour. The instant her eye encounters an unfamiliar word she exclaims "What's that?" I pronounce the word for her once, or at most twice, have her repeat it, and it is stamped in her memory; and thereafter she recognizes and pronounces it in whatever connection she meets it. In doing this she receives no aid from phonics. Up to the present time she reads by the word method only. The lightning-like rapidity with which her mind, apparently without effort or concentration, assimilates new word forms is almost uncanny. Since beginning this article I have had an opportunity to put this ability to a somewhat strenuous test. I brought the child to my office to spend the day with me away from the distracting influences of family life. I gave her a primer she had not previously seen—"Gordon's Reader, Book I." She read, with frequent intervals of happy play, for about three hours and a half, when she rebelled and refused to read further. During this period she covered the first forty-four pages of the primer (excluding three pages of verse), or a total of 2,464 words. In this number of pages she encountered fifty-one unfamiliar word forms, which were pronounced for her until she was able to repeat them, but which were not reviewed. The book was then put away for thirty hours, at which time of the fifty-one new words she recognized thirty-eight and failed on thirteen.

As the baby mind doubtless foreshadows the mind of the child of school age, a fact observed during the course of the experiment should be of interest to the educator. While it is true that her baby mind is capable of feats beyond the powers of older minds, this power displays itself in its highest perfection only during those hours of the day when her physical vitality is at its best. When physical weariness supervenes the collapse of the mental powers is more absolute and complete than in the case of an older child. In Martha's case, her mental powers are not at their highest immediately after awakening from a refreshing sleep. They begin to sparkle about two hours after she awakes, blaze forth in their greatest brilliancy four, five, or six hours after awakening, and then gradually decline. As bed time approaches they die out almost completely. Then, even if she expresses a desire to read, as she often does, her mind wanders from the

printed page, she is unable to assimilate new word forms, which leave no impression on her memory, and she completely forgets words with which she has long been familiar.

Since undertaking the experiment I have been warned by kindly friends against "over-taxing" the baby's mind, and have been favored with citations from the works of educators containing grave warnings against straining the mental powers of the young. The answer to such warnings appears to me to be, first, that the baby mind is naturally intensely active, and if Martha had been left to her own devices during the periods devoted to teaching her, her mind would have been just as actively occupied with something of no ulterior value to her as it was in fact occupied with learning to read; and second, that it is impossible to drive the baby mind beyond that which affords it pleasure, whether such pleasure is found in an act itself or in anticipation of a reward for doing the act. I have stated that at one stage in her development I occasionally lightly spanked her to get her to read, and, unexplained, this statement might imply that I thereby forced her to mental effort. The fact is, however, that the spanking merely served to wrest her attention from dolls and toys. When her attention was so diverted I directed it to the reading matter, a new interest and pleasure supervened, and she forgot her dolls. When the time comes, as it often does, when reading ceases to be a pleasure to her, and her interested attention can no longer be commanded, I have yet to discover a method of forcing her to proceed.

AESTHETIC JUDGMENTS OF SCHOOL CHILDREN

By Anna Berliner

The problem in these experiments was to find how various groups of children would rank a series of picture cards according to the aesthetic value of the pictures. The experiments were carried on with nine groups of twenty grammar school boys and nine groups of twenty grammar school girls chosen at random from the grades 8 B, 6 B, 6 A, 5 B, 5 A, 4 B, 4 A, 3 B, and 3 A of the Hebrew Orphan Asylum, New York City. The material used for the ranking consisted of 16 picture postals representing illustrations of rhymes and songs for children. The pictures were spread out at random on a table, and the child asked to find the most beautiful of all. As soon as the child had selected a card he was told to find the most beautiful of those that were left. This demand was repeated again and again until the child understood that he had to go on finding the most beautiful of those that remained. Each child was taken separately and was not allowed to see how the other children arranged the cards. The average position for each card was calculated, and the resulting eighteen series of values were correlated in the following way: each group of boys was correlated with each group of boys; each group of girls was correlated with each group of girls; and finally each group of boys was correlated with the corresponding group of girls, so that class 8 B of the boys was correlated with class 8 B of the girls, class 6 B of the boys was correlated with class 6 B of the girls, and so on. The correlations were found by the product-moments' method of Pearson. They are given in table 1, table 2, and table 3. With one exception (table 3, 6 A) all three tables show high correlations and a small probable error, a fact which justifies the following conclusions:

1. *Between the limits of grade 8 B and grade 3 A, and under our conditions, the ranking order of a group of pictures is to a high degree the same for all the grades.*

2. *Between the limits of grade 8 B and grade 3 A, and under our conditions, the ranking order of a group of pictures is to a high degree the same for both sexes.*

TABLE 1*

CORRELATIONS OF BOYS' CLASSES WITH BOYS' CLASSES

	8 B	6 B	6 A	5 B	5 A	4 B	4 A	3 B	3 A
8 B		0.80 0.06	0.34 0.15	0.61 0.11	0.50 0.13	0.71 0.09	0.56 0.12	0.42 0.14	0.37 0.15
6 B	0.80 0.06		0.40 0.14	0.81 0.06	0.48 0.13	0.89 0.15	0.61 0.11	0.69 0.09	0.63 0.10
6 A	0.34 0.15	0.40 0.14		0.49 0.14	0.71 0.09	0.44 0.13	0.58 0.11	0.15 0.16	0.47 0.13
5 B	0.61 0.11	0.81 0.06	0.49 0.14		0.55 0.12	0.99 0.02	0.73 0.09	0.75 0.07	0.73 0.08
5 A	0.50 0.13	0.48 0.13	0.71 0.09	0.55 0.12		0.60 0.11	0.71 0.08	0.52 0.12	0.56 0.12
4 B	0.71 0.09	0.89 0.15	0.44 0.13	0.99 0.02	0.60 0.11		0.73 0.08	0.79 0.06	0.67 0.11
4 A	0.56 0.12	0.61 0.11	0.58 0.11	0.73 0.09	0.71 0.08	0.73 0.08		0.60 0.11	0.80 0.06
3 B	0.42 0.14	0.69 0.09	0.15 0.16	0.75 0.07	0.52 0.12	0.79 0.06	0.60 0.11		0.77 0.07
3 A	0.37 0.15	0.63 0.10	0.47 0.13	0.73 0.08	0.56 0.12	0.67 0.11	0.80 0.06	0.77 0.07	
$\frac{\Sigma}{8}$	0.52	0.66	0.45	0.71	0.58	0.73	0.67	0.59	0.62

*All correlations are positive. The figures beneath the correlations give the probable errors. The averages are calculated from three positions.

TABLE 2*

CORRELATIONS OF GIRLS' CLASSES WITH GIRLS' CLASSES

	8 B	6 B	6 A	5 B	5 A	4 B	4A	3 B	3A
8 B		0.73 0.08	0.79 0.06	0.76 0.07	0.86 0.04	0.84 0.05	0.78 0.07	0.53 0.12	0.77 0.07
6 B	0.73 0.08		0.94 0.02	0.97 0.01	0.93 0.02	0.93 0.02	0.96 0.01	0.81 0.06	0.80 0.06
6 A	0.79 0.06	0.94 0.02		0.89 0.04	0.90 0.03	0.86 0.04	0.89 0.04	0.69 0.08	0.76 0.08
5 B	0.76 0.07	0.97 0.01	0.89 0.04		0.78 0.07	0.95 0.02	0.95 0.02	0.83 0.05	0.83 0.05
5 A	0.86 0.04	0.93 0.02	0.90 0.03	0.78 0.07		0.96 0.01	0.95 0.02	0.84 0.05	0.87 0.04
4 B	0.84 0.05	0.93 0.02	0.86 0.04	0.95 0.02	0.96 0.01		0.94 0.02	0.82 0.05	0.85 0.05
4 A	0.78 0.07	0.96 0.01	0.89 0.04	0.95 0.02	0.95 0.02	0.94 0.02		0.84 0.05	0.89 0.04
3 B	0.53 0.12	0.81 0.06	0.69 0.08	0.83 0.05	0.84 0.05	0.82 0.05	0.84 0.05		0.79 0.06
3 A	0.77 0.07	0.80 0.06	0.76 0.08	0.83 0.05	0.87 0.04	0.85 0.05	0.89 0.04	0.79 0.06	
$\frac{\Sigma}{8}$	0.76	0.88	0.84	0.87	0.89	0.89	0.90	0.77	0.82

* All correlations are positive. The figures beneath the correlations give the probable errors.

TABLE 3*

CORRELATIONS OF BOYS' CLASSES WITH GIRLS' CLASSES

	r.	p. e.
8 B	0.78	0.07
6 B	0.66	0.09
6 A	0.06	0.17
5 B	0.77	0.07
5 A	0.56	0.11
4 B	0.78	0.07
4 A	0.60	0.11
3 B	0.60	0.11
3 A	0.76	0.07
$\frac{\Sigma}{9}$	0.62	

* All correlations are positive.

The tables do not suggest any development in the aesthetic judgment between 3 A and 8 B. The question is whether there is a slight development in the judgment, a development so slight that it is covered as long as we consider only each class by itself. If we take the sum of the correlations of each class with its first and second neighbors for all the classes, and divide this sum by the number of correlations that enter into the sum, we obtain for the boys 0.620 and for the girls 0.895. If we determine in the same way the sum of the correlations of each class with its third and fourth neighbors and divide this sum by the number of correlations that enter into the sum, we obtain for the boys 0.620 and for the girls 0.883. Comparing these two pairs of numbers we find that the girls as well as the boys show a tendency to correlate higher with those classes that are near in grade than with those that are farther removed. The same tendency is brought out in the following way. We consider the averages of the correlations of each class with each class as represented in the last row of table 1 and table 2. We omit 8 B because the difference between 8 B and the following grade is greater than that between the others and their first neighbor. We take the four outer and the four inner grades together, forming the sum of 6 B, 6 A, 3 B, 3 A, on the one hand and that of 5 B, 5 A, 4 B, 4 A, on the other hand. The sum for the outer group is 2.32 for the boys and 3.31 for the girls. The inner group gives the sum 2.69 for the boys and 3.55 for the girls. The correlations for the inner groups are higher than those for the

outer groups. There exist more classes that are near in grade for the inner groups than for the outer groups. The greatest difference between an outer class and the class it is correlated with is seven grades; the greatest difference between an inner class and the class it is correlated with is four grades. We thus find again the same tendency to higher correlation in the classes that are nearer neighbors than in those that are farther removed.

TABLE 4

CORRELATIONS OF GRAMMAR SCHOOL GROUPS WITH COLLEGE GROUPS

	Columbia		Barnard	
	r.	p. e.	r.	p. e.
8 B	+0.08	±0.16	—0.41	±0.14
6 B	—0.34	±0.15	—0.49	±0.13
6 A	+0.25	±0.16	—0.60	±0.12
5 B	—0.28	±0.16	—0.51	±0.12
5 A	+0.04	±0.17	—0.46	±0.12
4 B	—0.27	±0.16	—0.35	±0.15
4 A	+0.19	±0.16	—0.54	±0.12
3 B	—0.44	±0.14	—0.33	±0.15
3 A	—0.16	±0.16	—0.56	±0.12
$\frac{\Sigma}{9}$	—0.10	.....	—0.47	.....

The same experiment was carried on with a group of 20 Columbia students and a group of 22 Barnard students. The correlations between the ranking of the Columbia students and the boys' classes are given in table 4 under *Columbia;* the corresponding values for the Barnard students and the different girls' classes are shown in table 4 under *Barnard.* The table gives only negative correlations under *Barnard* and contains five negative and four positive correlations under *Columbia.* The correlations in the girls' group are high enough and the probable errors small enough to allow the conclusion that the selective principle in the Barnard group is the opposite of the selective principle in the grammar school groups. Not only is there no agreement between the taste of the College and that of the grammar school girls, but the Barnard group judges those pictures beautiful that the children consider least attractive, and the children prefer those pictures that the students reject in their aesthetic judgment. The same holds true with the groups of school boys and the Columbia College students, although the relation does not come out as clearly as with the girls. The average of the sum of all the correlations between Columbia and grammar school groups is —0.10. The

corresponding figure for the girls' groups is —0.47. We are thus allowed to conclude:

3. *Whereas there is a high uniformity in the group taste of all the grammar school classes for boys as well as for girls, there is an absolute break between the group taste of the grammar school classes on the one hand and the college on the other hand.*

A control experiment was introduced to determine whether the break between grammar school and college groups is caused by the age difference or by the difference of the social standing of the observers. A group of ten children from grade 2, 5, 6, 7, all belonging to families from the upper middle classes, were asked to rank the pictures in the same way as the children from the orphan asylum had done.[1] This group was compared with a group from the orphan asylum consisting of children from grade 3, 4, and 5. The correlation coefficient is +0.44 with a probable error ±0.14. This correlation is lower than all the correlations in table 2. Considering however that the control group consists of only ten observers, and that both groups which enter into the correlation are mixed groups, a correlation which is more than three times as high as its probable error seems high enough to deserve consideration. How much in such mixed groups the coefficient is influenced by chance is shown by the fact that the correlation of the control group with an unmixed group, class 5 A,—selected at random—is +0.52 with a probable error ±0.12.

The coefficient of the control group with the Barnard group is —0.25 with a probable error ±0.16. This correlation, like all the coefficients between the grammar school and the Barnard groups, is negative. It is lower than the other coefficients, but it nevertheless brings out quite clearly the fact that the taste of the two groups tends to go in opposite directions. The control experiment thus justifies the conclusion:

4. *The break between the grammar school children and the college students is not due to a difference in the social standing of the two groups but to the age difference.*

If we compare the correlations in the grammar school as given in table 1 and table 2, we notice that the figures are much higher for the girls than for the boys. This relation is best seen by considering only the figures for the sum of the correlations of each class with each other class as shown

[1] This experiment was conducted by Miss Mary C. Doremus.

in the last row of the two tables. This sum is higher for each single class in the girls' table than in the boys' table. The lowest figure in the girls' table is higher than the highest in the boys' table. If we add these sums and divide them by the number of grades represented in the table (9), we obtain for the boys 0.614 and for the girls 0.847. The average deviation is 0.07 and 0.04 respectively. We thus conclude:

5. *Different groups of girls agree more closely in their aesthetic judgment than groups of boys.*

It is interesting to note that the boys correlate just as high with the girls as with one another. The average correlation of the boys' groups with one another is 0.61; the average correlation for the corresponding classes of the two sexes is 0.62.

Another sex difference is brought out by the comparison of the standard deviations, σ, of the average positions of the pictures as given in table 5. The standard deviation is smaller in each grade for the boys than for the girls. The average sum of the deviations is 36.69 for the boys and 57.70 for the girls. The mean deviation of these deviations is 2.28 and 3.40 respectively. We thus conclude:

6. *The average positions of the pictures differ more from one another in groups of girls than in groups of boys.*

TABLE 5

STANDARD DEVIATIONS OF THE AVERAGE POSITIONS OF THE PICTURES

	Boys		Girls
8 B	33.1	<	65.9
6 B	40.9	<	56.0
6 A	34.3	<	62.5
5 B	37.0	<	60.3
5 A	35.1	<	57.9
4 B	35.5	<	53.8
4 A	36.9	<	54.6
3 B	42.2	<	53.2
3 A	35.2	<	56.1
$\frac{\Sigma}{9}$	36.7	<	57.7

A similar relationship is brought out by the comparison of that measure of variability which has been introduced by Hollingworth into the psychology of ranking, *i. e.*, the ratio M.V./P.[2] M.V. designates the average variability and P the

[2] Hollingworth, H. L. "Judgments of the Comic," *Psychol. Rev.* vol. 18, 1911, p. 143. See also the same author's "Experimental Studies in Judgment," 1913, pp. 116-117.

total number of positions in the scale; M.V./P. thus designates the average variability divided by the number of positions. The values for this ratio are given in table 6. The ratio is higher in each grade for the boys than for the girls. The average for the boys is 0.221, that for the girls 0.180. The average deviation is 0.0038 for the boys and 0.009 for the girls. These facts allow the conclusion:

7. Inside the group the girls agree more closely in their aesthetic judgment than the boys.[3]

The same relationship obtains again for the Columbia and Barnard group, M.V./P. being equal to 0.210 for the men students and 0.177 for the women students.

It is evident that there is a certain connection between the sixth and the seventh conclusion. If all the observers had exactly the same taste, so that each observer would choose that picture as first that all the other observers considered best, and if this held good for the second, third, and all the other choices as well, then the standard deviation for the average positions from their arithmetical mean would be a maximum and the M.V./P would be a minimum. In this case M.V./P would be zero and σ would be determined only by the number of pictures. On the other hand, if there were no agreement in the taste at all, we would obtain the same rank order as if such order were determined only by chance. If in this case a large enough number of observers is taken all the pictures will have the same average positions, and σ will be a minimum, namely zero. In this case the M.V./P will reach its maximum, which is for any number of pictures 0.250 as long as the number of positions is the same as the number of stimuli which have to be distributed over these positions.[4] In these two cases there is a one-to-one relation between σ and M.V./P. But this one-to-one relation subsists only in these

[3] With regard to experiments giving smaller variability for girls than for boys compare William Stern, *Differentielle Psychologie*, 1911, pp. 276-278.

[4] If the number of observers is large enough each picture takes each position just as often as each other position so long as we have no selective principle but only a chance distribution. In case we have x positions, x pictures, and n observers (n being great enough) we obtain the same value for M.V./P. as if each picture takes each position only once. In this case each picture takes once the position 1, once the position 2, once the position 3, and so on up to position x-1 and finally position x. The arithmetical mean of all the x positions is $\frac{x\,(x+1)}{2x} = \frac{x+1}{2}$. The deviations of the single position from this average position are:

extreme cases; in general there is a certain mathematical independence between these two values. Only some of the changes in the one factor influence the other factor; other changes are without effect. The fact that there is a certain mathematical independence proves that the conclusions 6 and 7 have each a meaning for itself. The same fact may be brought out by comparing the σ and the M.V./P values in the following way. If we arrange the σs of the boys according to their values beginning with the lowest and ending with the highest, we obtain the series: 8 B, 6 A, 5 A, 3 A, 4 B, 4 A, 5 B, 6 B, 3 B. Arranging the M.V./P values in the opposite way, beginning with the highest and ending with the lowest, we obtain the series: 8 B, 5 A, 6 A, 3 A, 4 B, 5 B, 4 A, 6 B, 3 B. The two series agree quite well but not so closely as they would in the case of a mathematical connection. We obtain the same result by comparing the corresponding values for the girls, as may be easily seen from table 5 and 6.

If instead of comparing the M.V./P's of the boys and the girls we consider the variability of the individual cards in the groups of boys and the groups of girls, we find another sex difference which, although not so pronounced as the three preceding sex differences, may be noticed easily in table 7. Since we are interested only in a comparative study of the two sexes, and since the number of stimuli as well as the number of positions is the same in all groups, the gross variability gives just as good an insight and is more exact than the ratio M.V./P, for small differences might be easily covered by the division by the number of positions. The average devia-

$$\left\langle \frac{x+1}{2} - 1 \right\rangle; \left\langle \frac{x+1}{2} - 2 \right\rangle; \left\langle \frac{x+1}{2} - 3 \right\rangle; \ldots\ldots\ldots \frac{1}{2}; \left\langle \frac{x}{2} + 1 - \frac{x+1}{2} \right\rangle;$$

$$\left\langle \frac{x}{2} + 2 - \frac{x+1}{2} \right\rangle; \ldots\ldots\ldots \left\langle \frac{x}{2} + \frac{x}{2} - 1 - \frac{x+1}{2} \right\rangle; \left\langle \frac{x}{2} + \frac{x}{2} - \frac{x+1}{2} \right\rangle.$$

Adding these deviations we obtain $\frac{x^2}{4}$. The average of this sum gives M.V.$= \frac{x}{4}$ and M.V./P$= \frac{1}{4} = 0.25$. For odd numbers we obtain M.V./P$= \frac{x-1}{x} \frac{1}{4}$. The greater x, the nearer will M.V./P be to 0.25; for x = 11, it is already 0.99 times 0.25, $\lim_{x=\infty} \frac{x-1}{4x} = \frac{1}{4} = 0.25$. The ratio M.V./P can never be greater than 0.25 nor smaller than 0.' Thus this relation holds for odd as well as for even numbers.

TABLE 6*

M. V./P OF THE AVERAGE POSITIONS OF THE PICTURES

	Boys		Girls
8 B	0.226	>	0.159
6 B	0.216	>	0.187
6 A	0.224	>	0.168
5 B	0.222	>	0.174
5 A	0.225	>	0.183
4 B	0.223	>	0.191
4 A	0.219	>	0.189
3 B	0.212	>	0.192
3 A	0.224	>	0.181
$\frac{\Sigma}{9}$	0.221	>	0.180

* All correlations are positive.

TABLE 7

VARIABILITY OF THE BETTER AND POORER CARDS

	Boys			Girls		
	Good cards		Bad cards	Good cards		Bad cards
8 B	29.895	>	28.005	19.145	<	21.595
6 B	27.66	>	27.585	22.99	<	24.84
6 A	29.255	>	28.19	20.395	<	22.705
5 B	28.695	>	28.035	20.30	<	24.26
5 A	30.785	>	26.715	23.235	<	23.73
4 B	29.035	>	28.145	24.655	>	24.14
4 A	26.28	<	29.79	25.28	>	23.185
3 B	27.51	>	26.785	26.11	>	22.95
3 A	29.075	>	28.17	22.085	<	24.22
$\frac{\Sigma}{9}$	28.688	>	27.936	22.688	<	23.514

tions are divided up so that the eight better cards are taken together, and the eight poorer cards together. The sums of the average deviations of the better cards are given under "good cards," and the sums of the average deviations of the poorer cards are given under "bad cards." With the exception of one class, the figures for the boys are greater in the first column than in the second column. The boys agree more closely in their dislikes than in their likes. The opposite relation obtains with the girls. The girls agree more closely in their likes than in their dislikes, although this relation is not so clear as that with the boys, three classes being

different from the others. We are nevertheless allowed to conclude:

8. *Boys agree more in their dislikes than in their likes; girls agree more in their likes than in their dislikes.*

Comparing the Columbia and Barnard groups in the same way we see that here too the same relationship obtains. The figures for the Columbia group are in the good half 27.50 and in the poor half 26.37. The Barnard group gives 22.54 and 22.64 respectively. The same results were obtained—as far as girls are concerned—by Hollingworth with a group of ten girls in experiments on the judgment of the comic.[5] In his experiments on the judgments of persuasiveness, however. Hollingworth found the opposite relation with a group of twenty boys and a group of twenty girls.[6] Nor did the results agree in experiments which the present writer made with different groups and different material on the aesthetic judgment.[7]

If we combine, instead of the good and bad cards, the extreme and middle cards, taking together the cards that occupy the first, second, third, fourth, thirteenth, fourteenth, fifteenth, and sixteenth position on the one hand, and all the other cards on the other hand, we obtain results as represented in table 8. Column 1 and column 2 compare the

TABLE 8

VARIABILITY OF THE EXTREME AND MIDDLE CARDS

	Boys		Girls		Boys	Girls
	Extreme cards	Middle cards	Extreme cards	Middle cards	Difference	Difference
8 B	28.935	< 28.965	17.805	< 22.935	0.030	< 5.130
6 B	27.435	< 27.810	22.490	< 25.340	0.375	< 2.850
6 A	28.820	> 28.625	19.185	< 23.915	−0.195	< 4.730
5 B	26.715	< 30.015	18.710	< 25.850	3.300	< 7.140
5 A	28.225	< 29.275	20.775	< 26.190	1.050	< 5.415
4 B	27.265	< 29.915	23.280	< 25.515	2.650	> 2.235
4 A	26.620	< 29.450	21.405	< 27.060	2.830	< 5.655
3 B	26.515	< 27.780	23.195	< 25.865	1.265	< 2.670
3 A	28.020	< 29.225	22.785	< 23.520	1.205	> 0.735
$\frac{\Sigma}{9}$	27.617	< 29.007	21.070	< 25.132	1.390	< 4.062

[5] *l. c.*, p. 141.

[6] Hollingworth, H. L. "Judgments of Persuasiveness." *Psychol. Rev.*, vol. 18, 1911, p. 256.

[7] "Correlation between Aesthetic and Recognition Value" to be published later.

extreme and middle values for the boys; column 3 and 4 show the corresponding values for the girls. With but one exception the variability is smaller in the extreme values than in the middle values.[8] Column 5 and 6 give the differences between these two groups for the boys and girls. With two exceptions these differences are smaller with the boys than with the girls. The table thus allows the conclusion:

9. *The difference in the variability between the extreme and middle pictures tends to be greater in groups of girls than in groups of boys.*

This relation is not found in the Barnard and Columbia group.

The fact that our experiments yield a considerable number of values for the M.V./P allows us to get a certain insight into this ratio. Before turning to our values, however, it is necessary to consider the literature about this problem. Hollingworth introduced the ratio M.V./P instead of the crude M.V. used by Wells in his experiments on the variability of individual judgment.[9] Wells in his comparison of the ranking with different material (preference of picture postals, difference in pairs of colors, and weight), comes to the conclusion: "It has appeared that in the first class the judgments of the individual cluster about a mean which is true for that individual only, and which varies from that of any other individual more than twice as much as its own judgments vary from it; that in the second class, with the colors, the variability of the successive judgments and those by different individuals markedly approached each other, but still preserved a significant difference; while in the third class, with the weights, we found that there might be even an excess of the individual variability over the 'social.' This comparison seems to afford, to a certain extent, a quantitative criterion of the subjective."[10]

Instead of using this ratio of the individual and social variability, the "Inter-Intra-Quotient,"[11] Hollingworth proposes the M.V./P: "This ratio M.V./P can then be used as

[8] The same results were obtained in five other group experiments with college students. Cf. "Correlations between Aesthetic and Recognition Value."

[9] This problem is only part of the general problem of the reduction of measures of variability for comparative purposes. We need not enter into this general problem since our interest centers only around the specific reduction by the number of positions.

[10] Wells, Frederic Lyman. "On the Variability of Individual Judgment." *Essays philosophical and psychological in honor of William James,* pp. 547-548.

[11] Stern, William. *l. c.,* p. 259.

a reliable index of the objective character of judgments and with a greater accuracy than the crude M.V. employed by Wells;"[12] and again: "The size of this ratio would become smaller as the material came to be selected so as to disclose more pronounced or more objectively measurable differences."[13]

Comparing different material which has as the only constant factor the basing of the judgment on the affective reaction to the stimulus, Hollingworth finds that with different groups of observers and with a widely ranging value for P, M.V./P is usually 0.20, and with high reliability.[14] In contrast to experiments where the judgment is based on the affective reaction to the stimulus Hollingworth observes that in experiments with more objectively measurable differences this ratio becomes smaller. Thus figures gained by Downey in experiments in the judgments of resemblance of penmanship yield, according to Hollingworth, M.V./P = 0.165, = 0.157, and = 0.168.[15] Wells' experiments with colors and weights give M.V./P = 0.086 and M.V./P = 0.136 respectively. In his later publication, however, Hollingworth suggests giving up the difference between *objective* and *subjective* judgment: "—judgments of intensity, etc., will vary as much as those of preference if the differences afforded by the material are sufficiently slight."[16] And again: "It is to be expected that various sets of material, of the same content but with differing degrees of difference between successive items would show the same difference in 'subjectivity' as those found with different kinds of material."[17] Our material supports this conclusion. We find values for the ratio M.V./P as high as 0.226 and as low as 0.159. Hollingworth's table representing ten different groups shows as the highest value 0.250 and as the lowest 0.180.[18] Taking Hollingworth's and our own material together, we thus find a variation between 0.159 and 0.250. These figures are taken only from experiments based on a "subjective" category. The more "objective" experiments on the resemblance of penmanship vary in this ratio from 0.157 to 0.168. The still more "objective" experiments of Wells show a ratio of 0.136 for weights and a ratio of 0.086

[12] "Judgments on Comic," p. 145.
[13] *Ibid.*, p. 163.
[14] *Ibid.*, p. 145.
[15] *Ibid.*, p. 145.
[16] Hollingworth, H. L. "Experimental Studies in Judgment," 1913, pp. 116-117. We consider here only the one side of Hollingworth's analysis of the *subjective*, "the ratio of variability to series length."
[17] *Ibid.*, p. 144.
[18] *Ibid.*, p. 144.

for colors. Since Hollingworth's calculation makes the ranking of the weights appear more subjective than the ranking of the colors, and since this is in direct opposition to Wells' interpretation, we are justified in taking these two experiments in one class. Instead of taking Wells' ten observers together as Hollingworth did, I separate Wells' normal and abnormal observers, and thus obtain M.V./P = 0.155 for the abnormal and M.V./P = 0.107 for the normal group in the experiment with weights.[19] We thus obtain the following variations for our different groups:

1(based on affective tone.....0.250-0.159
2) resemblance of penmanship 0.168-0.157
3) color and weight 0.155-0.107

The first and second groups overlap one another to a great extent, and the second and third groups come very close to one another. In view of the fact that the ratio M.V./P can vary only between 0 and 0.250, the variations of the first group are very considerable. It seems unjustifiable to select one value like M.V./P = 0.200 as a representative value for the first group. The ratio M.V./P is a function not only of the category of the judgment but of the group that judges and of the material judged. We may obtain the same value for M.V./P with so-called subjective as with so-called objective judgment. The M.V./P is a measure for the strength of the selective principle in regard to a given group and a given material. We measure the strength of this selective principle by the position of the M.V./P in the series of values represented by all possible values between 0 and 0.25. In a case where the selective principle is absolute, the M.V./P will be zero; in a case where the selective principle is so weak that the distribution is due only to chance, the ratio will be 0.25. Thus in the case of the ten observers who arranged 35 advertisements according to their persuasiveness (see Hollingworth, Judgments on Comic, p. 144), the selective principle was so weak that it did not have any effect at all. The arrangement found there with ten observers was the same as a mathematical calculation would give. This example shows the importance of the M.V./P for the psychology of the ranking of advertisements. Only in case the M.V./P is smaller than 0.25, is the ranking of significance. Only in that case does there exist a principle of selection.

[19] Wells. *l. c.*, p. 545.

RATE OF IMPROVEMENT OF THE FEEBLE-MINDED AS SHOWN BY STANDARDIZED EDUCATIONAL TESTS

By KATHARINE MURDOCH, Columbia University, Extension Department

This study is an attempt to compare the rate of progress made by feeble-minded, with that of normal children, of the same mental age, in elementary school subjects. The subjects of the experiment were twenty-one feeble-minded individuals, who are at the State Institution for the Feeble-minded, at Polk, Pa. The selection of individuals in the institution was made upon the basis of school grade. It was requested that all school pupils in Grades IV, V and VI (the highest grades represented in the institution), should take part. There were 37 pupils in these grades who took part in at least one of the tests the first year they were given. One year later, however, when the tests were repeated, only 21 of the original pupils were available. The others either had left the institution, or were ill, or were otherwise employed. The results of the 21 who completed the tests only, are given here. All of these pupils but one, were still in school when the second set of tests was given, the one having dropped out in June, 1917.

The first set of tests was given during the last week of 1916 and the first week of 1917. I have called this the 1917 set of tests. The second set of tests was given one year later and is called the 1918 set. Exactly the same tests were given both years, and the procedure of giving them, insofar as it was possible to make it so, was identical. All tests were given by the writer. The tests were as follows: (1) Those given individually: Terman Intelligence Test and Sylvester form board test. (2) Those given in groups: Trabue Completion test, Scale B; Thorndike Visual Vocabulary; Thorndike Reading, Scale Alpha 2; Woody, Addition, Subtraction, Multiplication and Division tests, all series B; Ayer's Spelling, list T; Woodworth and Wells, Easy Opposites and Adjective-noun tests. The pupils were also directed to write a composition entitled "Christmas at Polk," and to make a drawing, each, of a man and of a house. These latter were graded by the use of the Thorndike Handwriting Scale, the Hillegas Composition Scale and the Thorndike Drawing Scale.

The procedure of giving all the tests was exactly that indicated by the author of each test, and the scoring also followed their methods precisely. In case of the composition and drawing tests, no time limit was given and the final score was the median judgment of from four to seven competent judges, using the judgment scales referred to. The Handwriting judgment was based upon the sample obtained in the writing of the compositions.

The accompanying table indicates the average school grade of the pupils in 1917 (some were in a lower grade in arithmetic); and for both years, the pupil's chronological age, mental age (as revealed by the Terman test), and Intelligence Quotient. The class averages are given for each year, columns 4 and 5. In the case of the visual vocabulary (row 9) and Ayer's Spelling test (row 15), a class score was obtained according to the directions of the authors of these tests. The mean square deviation of the distributions for each year is found in columns 6 and 7; the correlations between the 1917 and 1918 series are presented in column 8, and the sigma of these correlations in column 9; the improvement (shown by the difference between the class scores for the two years), and the mean square error of the improvement are found in columns 10 and 11.

An examination of column 8 immediately introduces interesting speculation as to the reasons for the very low correlations found between the 1917 and 1918 tests. The writer surmises that this is largely due to the very unequal rate of development obtaining in the different individuals. An inspection of the range in chronological ages, varying between twelve and twenty-three years, suggests one possible cause for this, although it does not seem to hold true throughout, by any means, that the greatest gains are made by the younger children. Particularly interesting are the low correlations found in mental age, .68, and in I.Q., .79. The former perhaps may be partly explained by the fact that many individuals were over 16 years of age in 1917 and so would not be expected to improve mentally—whereas others were below this age, and, according to accepted belief, would be expected to show a mental gain in a year's time. The I.Q. correlation, however, is not subject to this explanation, being always the ratio of the mental age to the chronological age, unless this latter is over 16 years, in which case it is treated as though it were 16 years. According to Terman, the I.Q. is a constant factor in any individual, and the correlation found between the I.Q.'s of any group of individuals, obtained upon two occasions, with

COMPARISON OF RATE OF PROGRESS BETWEEN 21 FEEBLE-MINDED SUBJECTS AND NORMAL CHILDREN

1	2	3	4	5	6	7	8	9	10	11	12	13
2	Factors Measured	Units	Class 1917	Average 1918	σ of Class 1917	Average 1918	r	σ of r	Improvement [4]	σ of Improvement	Norms for Grade 3	Norms for Grade 4
3	Grades	——	4.95	——	.724	——	——	——	——	——	3	4
4	Chron. Age (Range 12 yrs-23 yrs.)	Yrs. ms.	16–4	17–4	37 ms.	37 ms.	1	0	——	0	9.2	10.2
5	Mental Age (Range 7-6 to 11-1)	Yrs. ms.	9–2	10–0	13.28	17.43	.685	.1158	10 ms.	2.78	9.2	10.2
6	Intelligence Quotient	——	.6066	.6442	.0792	.088	.7945	.0805	.0376	.0006	1.0	1.0
7	Sylvester Form Board	Sec.	19.309	20.214	3.675	3.072	.5185	.1594	—.905	2.4557	18.7	16.7
8	Trabue Completion Test. Scale B	No. cor.	9.8	9.0	3.391	2.309	.5349	.1538	—.8	1.359	6.	8
9	Thorndike Visual Vocabulary	——	4.27	4.70	——	——	——	——	.43	——	——	——
10	Thorndike Reading Scale, Alpha 2	——	5.3019	5.459	.276	1.048	.5402	.1544	.1571	.582	5.25	5.75[1]
11	Woody, Addition	——	10.4	11.8	2.439	3.269	.663	.122	1.4	.544	9	11
12	Woody, Subtraction	——	8	8.3	3.116	2.059	.582	.144	.3	.554	6	8
13	Woody, Multiplication	——	7.52	9.04	3.381	2.935	.855	.587	.152	.386	3.5	7
14	Woody, Division	——	4.7	5.8	2.892	2.121	.677	.118	1.1	.466	3	5
15	Ayres, Spelling, List T	% cor.	40.9	41.7	29.42	30.43	.9733	.0118	.8	1.5617	50[2]	60[3]
16	Thorndike Handwriting Scale.	——	9.78	9.66	1.966	1.761	.703	.011	.12	.314	9	10
17	Hillegas Composition Scale	——	30.65	31.65	11.803	14.23	.5398	.1585	1.0	2.8337	——	35[4]
18	Thorndike Drawing Scale	——	5.9	6.59	2.414	2.723	.848	.066	.69	.341	——	——
19	Woodworth-Wells, Easy Opp., (Time, 1′ 45″)	No. cor.	12.25	14.95	4.535	4.621	.809	.077	2.675	1.68	——	——
20	Woodworth-Wells, Adj. Nouns, (Time, 1′ 20″)	No. cor.	9.71	12.368	4.392	4.965	.911	.039	2.658	3.77	——	——

[1] Norm for Grade 5. [2] Norm for Grade 5. [3] Norm for Grade 6. [4] Norm for Grade 5 is 40.

either a short or long interval of time elapsing, should theoretically be 1. I believe that the low correlation found in this study is due largely to the method prescribed, or at least allowed, by Terman, of scoring the tests. This method provides, in the testing of defectives, that when one test, at any age level is passed, the subject shall be allowed to try all tests at the next age level. But though Terman admits that the subject may be given opportunity to try at a higher age level, even if he has failed on all tests for the preceding year, he does not *insist upon this procedure*, and his own advice concerning the desirability of avoiding fatigue suggests to the examiner the advisability of stopping when all tests at any year have produced failure, particularly when he has already spent somewhat more than one hour upon the examination. The examinations reported here were made in that way, being discontinued when there was complete failure at any age level, and the method has evidently introduced an error. A close inspection of the individual records reveals the fact that the lowering of the I.Q. correlations here is due principally to the great improvement in mental ages made by five pupils, and in each case an examination of the original scores of these pupils has revealed that the great apparent gain is due to the fact that having passed one or more tests at certain age levels in 1918 which were failed utterly in 1917, the door was open for success at upper levels, and this success in the case of these five subjects was rather remarkable. The most marked illustration is that of a girl 13½ years old at the time of the first test with a mental age of 9, who, because of passing test 6 at year XII in 1918 (repeating five digits reversed), which test she had failed upon the previous year, was given further opportunity and succeeded with test 4 at XIV years (problems of fact), test 5 at XVI years (repeating 6 digits backward), and test 5 at XVIII years, or Superior Adult level (repeating seven digits backward), and advanced to a mental age of 11. The greatest advance in mental age, namely, from 8-2 to 10-6, was made by a boy 17 years old at the time of the first test.

The average mental age in 1917 was found to be 9 years and 2 months. Since the purpose of this study is to compare the rate of progress of these feeble-minded individuals with that of normal children of the same mental age, norms are given in our table, where such are known to the author, for normal children in the 3rd and 4th grades (columns 12 and 13). These norms represent a near approach to the normal performance of children of 9 years and 2 months, and those of children one year older. This fact was determined from

a study by Kelly (reported in *Teacher's College Record,* Sept. 1917), of a completion test language scale, in which norms are given for both ages and grades, and it was inferred that the same relation between age and grade which was found by Kelly, would obtain, at least approximately, in all the tests reported in this article. (From Kelly's figures, by interpolation, we find more exactly, that children of 9 years and 2 months correspond to Grade 2.8+.) The author regrets that the actual progress of the same normal children, made in a year's time, could not have been used for comparison, instead of norms for two successive school grades, but in the absence of the desired data, the difference between these norms for grades 3 and 4 surely offers a reliable estimate of the improvement which would be made by a group of normal children of 9 years and 2 months, who would repeat the tests after an interval of one year.

The norms here reported for normal children in grades 3 and 4 are to be found in the original report of the tests given by their various authors in the case of the Terman Form Board, Trabue and Woody tests. In the Thorndike Reading test and the Hillegas Composition Scale, no norms are given below the fourth grades. In the Ayer's Spelling test, scores for the T list are not given below the fifth grade. The norms here given for the Hillegas Composition Scale are published in the *Teacher's College Record* of January, 1917, as tentative standard scores obtained from results in eleven city school systems. The handwriting norms are from an unpublished study made in the Department of Educational Administration at Teacher's College, from results obtained in eight cities. Many of the standard scores are in terms of medians. These medians, however, have been obtained from large groups in which the distribution probably followed the normal curve, so, for practical purposes, they are quite comparable to the averages used in the present study.

In every case of the school subjects in which comparison can be made between the feeble-minded and the normal, it will be seen that our group of feeble-minded children in 1917, did better than normal children of the same mental age, an interesting corroboration of Goddard's belief that feeble-minded can do more at certain tasks because they have had much more practice with them. This is true of the Language Completion test (row 8), of the four operations of arithmetic (rows 11-14), and of handwriting (row 16). The Thorndike Reading Scale norms (row 10) show that the feeble-minded in 1918 did better in this test than normal chil-

dren of the same mental age (4th grade). In Composition (row 17), however, the reverse is true, normal fourth graders outranking our group in 1918, by a score of 35 to 31.65. In many of the tests we seem to be at, or near, a point where the "overtaking" is taking place, for we must now turn to our original problem, which was to compare the rate of improvement of the two groups.

Here our data seem all to point unreservedly to one conclusion, which is that the rate of learning of feeble-minded children in these elementary school subjects is less than the rate of normal children at the same mental level. The form board test (in which the score is in terms of time taken to put the blocks in position), the language completion test, all the arithmetic tests and handwriting all give the same results. The same is furnished by the reading scale (row 10), if comparison is made between the amount of improvement made in one year by normal children starting in the fourth grade. The fifth grade norm given by Thorndike is 5.75, which shows a gain of .50 in one year. The feeble-minded children gained only .16 in one year. The same comparison between the Fourth and Fifth Grades in Composition (4th Grade 35, 5th Grade 40, row 17), shows a much larger gain made by normal than by feeble-minded children in one year's time. The same thing can be seen by studying Ayers' norms for Spelling, row 15. Improvement in any of his spelling lists, from one grade to the next, is much greater than the gain made by our group in the T test.

One possible explanation of these results might be that the instruction of the feeble-minded group was poor, and that the time they spent in school was less than is the case with normal children. I believe, from consulting with the Superintendent of the Institution, that the second of these conditions does exist, but that, on the other hand, the instruction is given in small classes and by competent teachers, and can therefore be supposed to be above the average of schooling in general. This fact would probably offset the other, that the length of time spent in school each day is slightly less than in the case of most children.

The most probable explanation for our results seems to lie in the subjects themselves. Common sense has long been of the opinion that feeble-minded children learned less quickly than normal children at their same mental level, and our results would seem to add little to our knowledge, were it not for the findings of Woodrow, reported in the *Journal of Educational Psychology*, February, 1917. Woodrow trained

groups of feeble-minded and of normal children of the same mental age, in a geometrical form sorting test, and found that the rate of improvement for the two groups was similar. These results, Woodrow thinks, "strongly suggest that it is not inability to learn which characterizes incapacity for mental development, but inability to grow. . . ." The results of the present study seem to indicate that if the term "learning" can be properly applied to improvement in the elementary school subjects, that "inability to learn"—at least at the average rate—does then characterize incapacity for mental development. The discrepancy between Woodrow's results and those reported here seems to the present writer to be due to a difference in the test material used. Woodrow's test was one of pure habit formation, in which little analysis or abstract activity was required. Since it is in just this power to respond by partial activity or analysis that the feeble-minded are below the normal, in the opinion of many writers, one would naturally expect to find improvement in functions demanding this ability to be less than in cases of concrete habit formation, and this is what has been found in this investigation.

As for so-called mental age, whatever this well-known term may mean, according to the results of the present study, it does *not* mean either ability to do the same grade of work as that done by others of the same mental age, in most of the elementary school subjects; nor does it mean ability to make the same rate of progress in these same school subjects.

A GROUP POINT SCALE FOR MEASURING GENERAL INTELLIGENCE, WITH FIRST RESULTS FROM 1,100 SCHOOL CHILDREN[1]

By S. L. Pressey and L. W. Pressey

I. Origin and Plan of the Scale

In the autumn of 1917 the Departments of Psychology and Sociology of Indiana University undertook to make a survey of a certain county "X" in the southern part of Indiana to determine the number of mental defectives (feebleminded, epileptic, insane) in the county. The writers were to have charge of the mental testing done in connection with the survey. They were already committed to psychological research dealing primarily with the problem of selecting gifted children in the public schools for special classes, extra promotion, or other special educational treatment. But a combination of the two problems, where an educational survey should run parallel with a careful sociological study of the community, promised results of unusual interest. The reliability and significance of the results obtained in the schools might on the one hand be much more exactly determined if these results could be correlated with adequate sociological data regarding the individuals and localities studied. The educational study (which must naturally cover more cases than merely those suspected of mental defect) would on the other hand give a much wider basis for estimating the total mental make-up of the community than would otherwise be gained.

As a matter of fact the writers hoped to test *all* the school children of the county. Plans for research in the educational

[1] The present article from the Psychological Laboratory of Indiana University reports part of the work being done as a result of the creation of a special research position in the department of psychology, the holder (Dr. Pressey) devoting all of his time to research. Special acknowledgments should, therefore, be made to President W. L. Bryan and the University for the unusual opportunities provided; to Professor W. F. Book, director of the Laboratory, for suggesting the problem and arranging for research in this special field of work; also for helpful suggestions in organizing and carrying on the research of the year. The Group Scale, here briefly described, is only part of a larger study, carried out under his general direction. The results from this larger study will be published as soon as the data can be tabulated and carefully studied.

field already made had centered around the development of group tests of intelligence. As a method of first selection in a search for mentally defective or mentally superior children Yerkes, Pintner, and Whipple had already pointed out the value of the method;[2] group tests were being suggested for a similar purpose in the army. But it seemed likely that group test ratings might be of considerable further practical educational value, because of the growing tendency to divide classes into sections according to ability. Particularly in the "Junior High Schools" there is much interest in any plan which will readily give some measurement of the general intelligence of all the children in a class as an aid in making such divisions.

The writers were, however, most interested in a third problem of much practical and theoretical importance which also called for a group scale for measuring general intelligence. It has been generally acknowledged by workers with tests of intelligence—from Binet on—that norms vary widely according to the sociological status from which children come.[3] There is a very considerable body of evidence to indicate that we need racial norms.[4] Children coming from homes where English is not spoken rate definitely lower than children whose home language is English, (see Yerkes, Bridges, and Hardwick, *ibid.*, pp. 64-8). This is only one of the many special factors which an examiner may have to deal with.[5] It is,

[2] Yerkes in a paper delivered at the annual meeting of the Massachusetts Society for Mental Hygiene, Nov. 1917; Pintner "The Mentality of the Dependent Child, together with a Plan for the Mental Survey of an Institution," *Journal of Educational Psychology*, vol. 8, 1917, pp. 220-238, and Whipple in a report at the meetings of the American Psychological Association, New York, 1916.

[3] W. Stern, *The Psychological Methods of Testing General Intelligence*, pp. 50-57; Terman, *The Measurement of Intelligence*, pp. 114-18; Yerkes, Bridges, and Hardwick, *A Point Scale for Measuring Mental Ability*, pp. 73-83.

[4] E. D. Rowe, Five Hundred Forty-Seven White and Two Hundred Sixty-Eight Indian Children, tested by the Binet-Simon Tests, *Ped. Sem.*, vol. 21, 1914, pp. 454-69; Redfern H. Loades and S. G. Rich, Binet Tests on South African Natives-Zulus, *Ped. Sem.*, vol. 24, 1917, pp. 373-83; W. H. Pyle, The Mind of the Negro Child, *School and Society*, vol. 1, 1915, pp. 357-60; B. A. Phillips, The Binet Tests Applied to Colored Children, *Psychological Clinic*, vol. 8, 1914, pp. 190-96; A. C. Strong, Three Hundred Fifty White and Colored Children Measured by the Binet-Simon Measuring Scale of Intelligence, *Ped. Sem.*, vol. 20, 1913, pp. 485-515; Dagny Sunne, A Comparative Study of White and Negro Children, *Journal of Applied Psychology*, vol. 1, 1917.

[5] The writers are convinced, for instance, that on no one of the standard scales of intelligence should country children be judged by the same standards as city children. There are numerous elements in these scales which are distinctly urban. Country children frequently show also a different attitude toward the examination. They are less

therefore, obvious that the problem of the exceptional child, and in general the problem of adapting school training to the abilities of individual pupils, varies according to the variations in ability in a given school or locality. The child who would be exceptional in one neighborhood might be near the average in another. It is much more important that allowances for differences in ability be made in a school showing wide range in ability,—a school containing a number of very dull and very bright pupils,—than in a school where the range of distribution is narrow. Some measurement giving the average and distribution of abilities in the school as a whole should thus be the first step in any attempt to adapt the school organization to differences in ability found among children.

But now the sociological aspect of the problem appears. If the worker with mental tests must take account of sociological facts, his results should be useful as sociological data. The average level of intelligence of the school children of a community is the best single indication of the general intellectual level of the community as a whole. Facts regarding the distribution of abilities in the school population should give information of great value as to the homogeneity, make-up, and status of the total population of the locality, information contributing directly to our understanding of such phenomena as pauperism, criminality, economic and social status.[6]

Whatever might be the case so far as the educational problems were concerned, at least for such wholesale testing of entire communities as we have just suggested a group scale seems clearly necessary. The writers felt that no set of tests available was satisfactory for the purpose in hand. They desired, in the first place, a scale composed of tests which should be applicable over a wide range of ages—if possible, from the second grade through high school—and which should be highly differential of general intelligence throughout this

used to strangers and express themselves less readily. The group examination has been of great use in the country schools just because the country children are often handicapped in such ways, if examined individually, but respond readily in the group. The writers feel that ratings of intelligence, by both individual *and* group method, are necessary for an adequate measurement of a child's ability.

[6] In fact the community survey by means of mental tests promises to be one of the most interesting and valuable of the recent developments in the field of mental testing. Its possibilities, in connection with social, economic, and also racial problems appeals to the imagination as does almost no other branch of the science. See, for example, Pintner, "A Mental Survey of the School Population of a Village", *School and Society*, vol. 5, 1917, pp. 597-600; D. G. Patterson, "Mental Survey of the School Population of A Kansas Town" *School and Society*, vol. 7, 1918, pp. 84-8.

range. They felt, in the second place, that where group tests were to be given to younger children special methods for obtaining and controlling the attention of the children were a necessity if the ratings were, particularly in individual cases, to be reasonably reliable. They realized, in the third place, that for such extensive practical work and research the tests must be very carefully planned and arranged for convenience and economy of time and effort in scoring and also for ready handling of the data in research. One of the chief aims of the psychological study was to obtain a large amount of data for the study, by test, of sex, race, environmental and other differences.

An attempt to develop a set of tests which should meet these three requirements has resulted in what is here called the "Group Point Scale" for measuring general intelligence. The ten tests of the scale were selected from thirty tests experimented with. The writers made themselves thoroughly familiar, by means of Binet ratings, teachers' estimates, and school histories, with the abilities of the children in the third and fifth grades of the Bloomington, Indiana, schools, and with a group of eighth grade children and High School Sophomores. It was required of each test, in the first place, that the beginning be easy enough and the directions clear enough so that nine-tenths of the 3B children would make some score, and that the end of the test should be hard enough so that no one of the high school sophomores (averaging sixteen years old) would make a perfect score. The tests were then selected according to their ability to differentiate, at each grade, the bright and the dull children.

Tests which would fulfil to a fair degree the first requirement—range of applicability—were thus selected. The most original features of the scale have to do with the attempt to meet the second requirement, of careful adaptation in the nature of the tests, and in flexibility and ease in control of the class, for work with school children. The tests have, the writers believe, in an unusual degree an intrinsic interest and appeal for children. There is, within the limits set by the general plan and organization of the scale, great variety in the form of the tests, the content, and the method of giving. The directions are such that the children take part, with questions and answers from the class, in the explanations of the examples preceding most of the tests. There is an alternation of tests in which the examiner gives the test item by item with those where the task is set and the child is left to himself to complete it (tests 2, 4, 6, 8, 10). A scale made up wholly of

tests of the latter sort, is, the writers feel, unsatisfactory for examination of at least the younger school children, by the group method.[7] Group tests, when given to school children, very often have a stiffness and artificiality which seriously modifies the results, particularly when (as with intelligence tests) the individual ratings as well as the class averages are to be used. To an observer the present examination is much like an ordinary class exercise so far as easy relation of examiner to class and friendly co-operation between the two is concerned. Much more is, of course, demanded of an examiner in the way of personality, ready control of the children, and thorough grasp of the directions. But good examining always requires skill—it might be well if more stress were put upon this fact, and less energy expended in trying to make tests "fool-proof." The effort of the writers has been to arrange an examination such that the skilful examiner might develop something of the easy control of his class that a good Binet worker has of his single patient. He must be able to reach out to this individual or that, stimulate interest and rivalry, supply a touch of humor now and then, and swing the class as a whole into a united effort where not only the class as a whole, but each individual in it, shall be in rapport with the examiner and stimulated to do his utmost.

The results of the effort to meet the third requirement, of convenience and economy of time in both practical work and research, may be more briefly indicated. The clerical labor of the child in taking the examination is slight; only three tests call for much writing, and then only for single words, mostly monosyllables. Each item on each test can be scored as unequivocally right or wrong; the scoring is easy and of a routine nature. The writers use a stencil, which is placed over the blank, in scoring. The stencil has openings through which the child's answers appear, with the correct answer written beside the opening on the stencil. With this device it is possible for a good stenographer to score the entire record of one pupil in about two minutes. Finally, the total organization of the scale has been carefully considered with reference to con-

[7] This alternation is further of much interest, in that variations in performance under these two conditions give a measure of instability. The impulsive, nervous, high strung child (every clinical psychologist is familiar with the type) does fairly well if the examiner keeps the test constantly before him by presenting it bit by bit, but wanders quickly to other matters if left by himself with a problem. A statement of "irregularity" gives a measure of this factor. See S. L. Pressey, Distinctive Features in Psychological Test Measurements Made upon Dementia Præcox and Chronic Alcoholic Patients, *Journal of Abnormal Psychology*, vol. 12, 1917, pp. 130-139.

File..... Schedule D

INDIANA UNIVERSITY

MENTAL SURVEY — GROUP STUDY

Name.....Age.....Birthday.....Grade.....
Teacher.....School.....Place.....State.....
Date.....*Score*.....*Percentile*.....*M.A.*.....*Irreg.*.....

I. Rote Memory.

1.....	6.....	11.....	16.....
2.....	7.....	12.....	17.....
3.....	8.....	13.....	18.....
4.....	9.....	14.....	19.....
5.....	10.....	15.....	20.....

II. Logical Selection.

Examples: **DOG: ears, collar, nose.**
BOOK: table, pages, shelf, printing.
CHAIR: arm, cushion, legs, rockers, seat.

1. CAT—fur, house, milk, claws.
2. TREE—apples, branches, acorns, roots, flowers.
3. SPELLING—book, writing, pencil, words, margin, letters.
4. SCHOOL—blackboard, teacher, window, pen, bell, school-house, pupils.
5. STORE—counter, clerk, cash register, advertisements, goods, boxes, stove.
6. BUILDING—windows, wood, chimney, wall, shingle, roof, stairs, shed.
7. DEBT—mortgage, creditor, money, lawyer, collector, debtor, bankruptcy.
8. SICKNESS—lameness, death, weakness, hospital, nurse, discomfort, doctor.
9. GOVERNMENT—capitol, consul, navy, freedom, King, senate, cannon, tax.
10. FRIENDSHIP—adoration, liking, lover, obedience, imitation, helpfulness, worship, girl.

III. Arithmetic.

1.....	6.....	11.....	16.....
2.....	7.....	12.....	17.....
3.....	8.....	13.....	18.....
4.....	9.....	14.....	19.....
5.....	10.....	15.....	20.....

IV. Opposites. Examples: poor—rich.
quick.....
hot.....

1. bad	1.....	11. from	11.....
2. short	2.....	12. top	12.....
3. little	3.....	13. apart	13.....
4. black	4.....	14. less	14.....
5. high.	5.....	15. never	15.....
6. light	6.....	16. bless	16.....
7. day	7.....	17. country	17.....
8. thick	8.....	18. past	18.....
9. few	9.....	19. motion	19.....
10. peace	10.....	20. if	20.....

V. Logical Memory.

1.....	6.....	11.....	16.....
2.....	7.....	12.....	17.....
3.....	8.....	13.....	18.....
4.....	9.....	14.....	19.....
5.....	10.....	15.....	20.....

VI. Word Completion. Example: c...w.

1. c...t	11. a...t...mo...i...e
2. b...by	12. g...v...rn...e...t
3. tra...n	13. p...tat...
4. b...sket	14. d...cta...i...n
5. b...n...na	15. pa...ri...t...sm
6. tel...g...am	16. org...ni...a...i...n
7. sw...at...r	17. c...lu...n
8. eng...n....	18. t...a...h...r
9. a...it...me...ic	19. f...e...d.... ....
10. c...len...ar.	20. s.... ...et...i...g

VII. Moral Classification. Examples: marking, desks, giving, smoking, begging.

Whispering, stealing, charity, drunkenness, passing notes, kindness, sickness, gambling, tardiness, friendliness, extravagance, swindling, being noisy, benevolence, disobedience, forgery, justice, dissipation, graft, gluttony.

VIII. Dissected Sentences. Examples: See a I man.

knife the sharp is
cat dogs the after ran
two

1. the cat see.
2. trees pine tall are.
3. boy was the sick.
4. I not do to like go school to.
5. me give my straw hat.
6. all know big boys how skate to.
7. their soldiers for fight country.
8. in the he brightest is boy class our.
9. teacher me gave a pencil my.
10. brother is my than I older.
11. asked me way I girl the to show the.
12. boy stone the who threw ran the fence the behind.
13. dash brother broke for my the yard fifty record the.
14. man whom the saw is you uncle my.
15. river the John to swim tried was straight but across carried downstream.
16. the boy in is class only our old youngest ten years.
17. you me to direct office of will the principal the?
18. watch the man stole is jail who the in.
19. who the sing during birds so summer the flown the sweetly to have south.
20. boy gold who highest watch which beautiful prize jumps the get the will is a.

IX. Practical Information. Examples:

man		**train**
cow		**mule**
hen	**X**	**horse**
dog		**bicycle**
cat		**steamboat**

1.	2.	3.	4.	5.
water	string	milk	drop the handkerchief	Fourth of July
wood	chalk	salt	football	Washington's Birthday
cork	steel	bread	baseball	Memorial Day
sand	glass	fish	hide and seek	Thanksgiving Day
iron	pencil	meat	checkers	Labor Day

6.	7.	8.	9.	10.
scissors	policeman	bill	small pox	weaver
chisel	sheriff	coins	scarlet fever	cabinet-maker
plane	senator	check	measles	riveter
saw	mayor	draft	tuberculosis	typesetter
knife	representative	stamps	diphtheria	coal-picker

X. Analogies.

Examples: **girl—woman: boy—man**
sun—day: moon.....
good—bad: big.....

1. woman—girl: man.....
2. kitten—cat: puppy.....
3. sky—blue: grass.....
4. fire—warm: snow.....
5. winter—autumn: summer.....
6. horse—trot: fish.....
7. long—short: thick.....
8. train—land: boat.....
9. oyster—shell: banana.....
10. mother—daughter: father.....
11. hill—valley: high.....
12. arm—elbow: leg.....
13. truth—falsehood: straight line.....
14. like—friend: hate.....
15. teach—learn: teacher.....
16. known—unknown: past.....
17. little—small: ancient.....
18. water—pipe: electricity.....
19. age—youth: autumn.....
20. failure—laziness: success.....

QUESTIONS

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venience in dealing with data. There are ten tests, each one contains twenty items, or points. The value of this plan—for tabulation, or analytical study by test, is obvious.

II. The Tests

Further details as to the exact nature of the examination can best be gathered from the facsimile blank and folder of directions given below.

General Technique

The examination ordinarily takes 45 minutes, but with third grade children it may run over an hour. Part of the extra time with the younger children goes into supervising the writing of name of teacher and school, date, and so on. With young children it is also necessary to make clear, by holding up a sample blank and pointing to the place, where each test is to be answered. But most of the time is spent in making certain that the examples are understood. It has been found most satisfactory to permit no questioning on the part of the children except on the examples, nor should there be any repetitions of directions except in explaining the examples, which should not be left till the class shows a unanimous understanding of them.

The directions (except, as just mentioned, in making clear the examples) should be given verbatim as printed. The words of the rote memory test should be read at a rate of about two words per second. The exact time consumed by each individual item of the *arithmetic, logical memory,* and *practical information* tests cannot be given. It has been intended that these should be "work-limit" rather than "time-limit" tests, that time should be given for all except the very slow pupils to do all they can do. The examiner should, therefore, watch his class, and be careful not to travel too fast for the children. When working with the younger pupils the extra time they require in writing must be allowed for. Some evidence of the way the timing of these tests has been handled by the writers may be gained from the fact that the times have run from three to five minutes each for the rote memory and practical information tests, and six to eight minutes for the arithmetic test, with two minutes for the questions of logical memory. With third grade children the last five arithmetic problems may be omitted. For all others the tests should be given entire, whatever the grade.

Directions to Pupils

All write your name please at the top of the page where it says "name", and your age where it says "age", then your birthday—month and day of the month—then your grade. On the second line write the name of your teacher where it says "teacher", then the name of the school (district, if country), place, (city or township), and the state, (Indiana). On the third line write the date (give date).

Now I am going to give you some tests. Please do your best, do your own work, and do *not* pay any attention to what those around you are doing.

I. Rote Memory

Just below where you have been writing are twenty empty lines, Do you all see them? (Show place on blank). I am going to read you some lists of words, so listen very carefully as I shall read each one but once. Do not write while I am reading; wait till I get through and then write the word I tell you to write.

1. This is the first list of words: *hat,* boy. Write on the first line the word that came after hat.
2. This is the second list: *mouse,* chair. Write on the second line the word that came after mouse.
3. This is the third list: cat, *baby,* cow. Write on the third line the word that came after baby, etc., for each line. (Repeat statement for each of the following lists.)
4. *paper,* watch, ink.
5. *horse,* stone, window.

This is the sixth list: Write the answer to this question on the sixth line.

6. ground, milk, *desk,* hand.
7. *lamp,* kitten, tree, girl.
8. ruler, *clock,* table, box.
9. *street,* glass, cloud, shelf.
10. spoon, print, red, *milk,* green.

This is the eleventh list: Write the answer to this question on the eleventh line.

11. chalk, *man,* bag, book, sister.
12. mother, chair, *think,* best, rain.
13. *run,* dark, hard, pen, flower.
14. ball, *shoes,* sleep, sick, bright.
15. light, past, *bed,* dog, match, coat.

This is the sixteenth list: Write the answer to this question on the sixteenth line.

16. swim, dull, plow, *sky,* ship, dress.
17. *ring,* foot, jump, snow, flat, child.
18. point, noise, *cook,* river, dead, long.
19. pencil, *quick,* house, hill, run, store.
20. grass, rain, *woman,* cloth, see, true, warm.

II. Logical Selection. (Time 3 minutes.)

Just below where you have been writing are some words in big letters. Each one is followed by a list of other words in small letters. Look at the examples: the first word in big letters is "dog." What two things in the list following is a dog never without? (Have class

give answer).....Those two words are underlined. Look at the second example. What two things in the list following "book" is a book never without? (Class answers question).....Put a line under each of these words, just as there is a line under "ears" and under "nose" in the first example. Now look at the third example. What two things in the list following "chair" is a chair never without?.....Put a line under each of these two words, just as you put a line under "pages" and under "printing" in the second example. Now hold up your pencils like this so you will all start together. In each of the ten lists, just below, put lines under the two words which the word in large letters, at the head of the list, is never without, exactly as you put lines under "pages" and "printing" and "legs" and "seat" in the two examples. And one thing more: do not underline more than *two* words in any list.

III. Arithmetic.

Just below where you have been working you will see a number of lines numbered from 1 to 20. On these lines I want you to write the answers to the questions I am going to read. Do the questions *in your head.* If you miss an answer leave the line blank.

1. On the first line write the answer to this question: If you had 5 eggs, and broke two, how many would you have left?
2. On the second line write the answer to this question: If you had 10 apples, and gave 1 to your mother and 1 to your father, how many would you have left?
3. If you had 25 marbles and lost 4, how many would you have left?
4. If you had 25 sticks of candy, and you gave 5 to your sister and 6 to your brother, how many would you have left?
5. If you had 25 rabbits, and 4 of them were killed and 8 more ran away, how many would be left?

On the sixth line write the answer to this question:

6. If you had 25c and bought 5 papers at 2c each, how much would you have left?
7. If you had 15c and bought three blocks of paper at 3c each, how much would you have left?
8. If you had 25c and you bought two handkerchiefs at 10c each, and a pad of paper at 3c, how much would you have left?
9. If you had 25c, and you bought 2 erasers at 3c each and a bottle of ink at 5c, how much would you have left?
10. If you had 50c, and bought a half dozen eggs at 60c a dozen, how much would you have left?

On the eleventh line write the answer to this question:

11. If your father gave you 30c, and your mother gave you ½ as much, and you spent a third of what you had in all, how much would you spend?
12. If you could walk a mile in 20 minutes, how many miles could you walk in 2 hours and a half?
13. If you spent 5c a day for a week, and then spent twice as much each day of the next week, how much would you spend in all?
14. If you had 30 books, and you gave away one-third of them and then lost 3, how many would you have left?
15. If you rode 5 miles and a half in a taxi cab, at 50c a mile, how much money would you spend?

On the sixteenth line write the answer to this question:

16. If you had a dollar, and you went down town spending 5c on the way down, and twice as much on the way back, and bought 2c

stamps for twelve letters while you were there, how much would you have left?

17. If you bought 3½ lb. of sugar at 10c a lb., and a gallon of milk at 12c a qt., how much would you spent?

18. If you could copy a list of 100 words in 5 minutes, how many words could you copy if you worked 40 minutes a day for 4 days?

19. If you had 50c and you bought 5 pints of milk at 12c a qt., a half lb. of candy at 10c a lb. and a loaf of bread at 9c, how much would you have left?

20. Suppose your family has to have 5 loaves of bread each week. If bread should go up from 7c to 10c a loaf how much less butter, at 30c a lb. would you have to use, and still pay the same for butter and bread?

IV. Opposites. (Time 3 minutes.)

Turn over the page; at the top of the page there is a list of 20 words, with a blank line at the side of each one. Look at the first example, the word is "poor." What is the opposite of "poor;" if you are not poor, what are you? (Have the class answer).....Look at the second example, the word is "quick." If you are not quick what are you? (Class answers question).....Write the word "slow" on the line beside "quick," because slow is the opposite of quick. Look at the third example, the word is "hot." What is the opposite of hot? (Class answers question).....Write the word "cold" on the line beside "hot," because cold is the opposite of hot. Now write the opposites of all the other words in this list on the lines beside them. On the line numbered 1 write the opposite of "bad," on the line numbered 2 write the opposite of short, and so on for the twenty words. If you come to one you do not know, skip it and go on.

V. Logical Memory.

This time, put your pencils down. I am going to read you a newspaper article and I want you to listen very carefully, for I shall read it only once and then shall ask you several questions about it. You are to write the answers to the questions on the twenty empty lines just below where you have been working. This is the article:

"East Chicago, January 17. A fire on Washington Street, early this morning, destroyed Smith's grocery store, a barn and two dwelling houses near. The loss was about $12,000 and was partly covered by insurance. Six gallons of kerosene in the rear of the store burned fiercely, and made the fire hard to put out, because throwing on water only spread the flames. Mr. Smith lived over the store with his wife, two sons, and a daughter. The youngest, Mary, five years old, was made unconscious by the smoke and was rescued by a neighbor with some difficulty. The younger son, Harry, seven years old, helped his father in removing some of the goods from the burning store. Sparks, carried by a strong west wind, spread the fire to the adjoining buildings. Some think the fire was accidental, but the cash drawer was found open and empty, so the fire was probably set to conceal a robbery."

Now answer these questions with just one word—yes or no, or a name or a number. Write the answer to this question on the first line:

1. Were the buildings insured?
2. Was the oldest child overcome by smoke?
3. Was she rescued by her father?

4. How many children were there in all?
5. Was Harry five or ten years old?
Write the answer to this question on the sixth line:
6. How many dwelling houses were burned?
7. Was the kerosene the cause of the fire?
8. How many gallons of kerosene were there?
9. Was the wind blowing from the north?
10. What was the youngest child's name?
Write the answer to this question on the eleventh line:
11. Did Mr. Smith live in one of the adjoining houses?
12. Was the fire in the summer time?
13. Was Mrs. Smith badly burned?
14. On what street was the store?
15. On what day of the month did the fire take place?
Write the answer to this question on the sixteenth line:
16. Did the fire burn three or five buildings?
17. How great was the loss?
18. What part of Chicago was the fire in?
19. How much money was found in the cash drawer?
20. Did the fire burn down a drug store?

VI. Word Completion. (Time 3 minutes.)

At the bottom of the page you will see a list of words: wherever you see a line in these twenty words it means that a letter has been left out. And I want you to fill in these letters. Now all start.

VII. Moral Classification. (Time 1 minute for each group.)

At the very top of the next page you will see three lines of words; look at the examples. They read "marking desks, giving, smoking, begging." Do you all see them? What words of the examples mean something which you must not do in the school-room? (If "smoking" is given by the class say: "Why, you wouldn't be likely to smoke *in* the school-room anyhow, would you?") That word has a number "1" under it. What word in the example means being good to other people? (Class answers).....Put a number "2" under that, in the same way that there is a number 1 under "marking desks" in the first example. What word in the example means something that will hurt yourself? (Class answers).....Put a number "3" under that. What word in the example means getting something unfairly from some one else? (Class answers).....Put a number "4" under that. Now pencils up.

1. Go through the list (it begins with "whispering") and put a number "1" under each word which means something that it is wrong to do in the school-room, in just the way that there is a number "1" under "marking desks" in the example.

2. Pencils up. Now go through the list again and put a number "2" under every word which means being good to other people, in just the way that you put a number "2" under "giving" in the example. And one thing more, do *not* put more than one number under any word.

3. Pencils up. Now go through the list a third time and put a number "3" under every word which means something which hurts yourself, is bad for yourself, just as you put a number "3" under "smoking" in the example. And again, do *not* put more than one number under any word.

4. Pencils up. Now go through the list a fourth time and put a

number "4" under each word which means getting something unfairly from some one else, in just the same way that you put a number "4" under "begging" in the example. And once more, do *not* put more than one number under any word.

VIII. Dissected Sentences. (Time 5 minutes.)

Now pencils up—all stop. Look at the examples just below where you have been working. The first example is "See a I man." That does not make sense, does it?.....How should it read? (Class answers).....What *should* be the first word? (Class answers) .....That has a line under it. What *should* be the last word? (Class answers).....That has two lines under it. Look at the second example. How should it read? (Class answers).....What should be the first word? (Class answers).....Put a line under it in just the way that there is a line under "I" in the first example. What should be the last word? Put two lines under that in just the way that there are two lines under "man" in the first example. Now look at the third example; what ought to be the first word if the sentence is to make sense? (Class answers).....Put a line under it. What ought to be the last word if the sentence is to mean anything? (Class answers).....Put two lines under that. You see the sentence should read "Two dogs ran after the cat." Now go through the 20 sentences just below and in each one put one line under what should be the first word, and two lines under what should be the last word, if the sentence is to make sense, just as you put lines under "the" and "sharp," and "two" and "cat," in the examples.

IX. Practical Information.

Turn over the page. At the top are two examples. The first one reads "man, cow, hen, dog, cat." Of those five animals, which one usually lives the longest? (Class answers).....That has a line *under* it. Which one usually lives the shortest time? (Class answers) .....That has a cross *after* it. Now look at the second example, "train, mule, horse, bicycle, steamboat." Of those five, which goes fastest? (Class answers).....Put a line under it, in just the way that there is a line under "man" in the first example. Which goes slowest? (Class answers).....Put a cross after it, in just the way that there is a cross after "hen" in the first example.

Now look at the list numbered 1. Put a line under the thing that is heaviest, and a cross after the thing that is lightest.

Look at list number 2. Put a line under the thing it is hardest to break, and a cross after the thing it is easiest to break.

Look at list number 3. Put a line under the thing that costs most, and a cross after the thing that costs least.

Look at list 4. Put a line under the game that it takes most people to play, and a cross after the game that it takes fewest people to play.

Look at list 5. Put a line under the holiday that comes nearest New Year's and a cross after the holiday that comes nearest the middle of the year.

Look at list 6. Put a line under the tool that is hardest to sharpen, and a cross after the tool that is easiest to sharpen.

Next look at list 7. Put a line under the most important man and a cross after the least important man.

Next look at list 8. Put a line under the safest way to send money, and a cross after the least safe way.

Now list 9. Put a line under the disease that it takes longest to get well from and a cross after the disease one recovers from quickest. Now the last list. Put a line under the man who must have most skill, and a cross after the least skilled worker.

X. Analogies. (Time 3 minutes.)

Now the last test of all. The first example reads: girl-woman: boy-man. When a girl grows up, she is a woman: when a boy grows up, what is he? (Class answers).....So "man" should be the fourth word for it finishes the meaning of the other three words. Look at the second example. It reads sun—day; moon—.....The sun shines during the day, and the moon—when? (Class answers).....So "night" is the right word for it finishes the meaning of the other three words. All write "night" on the line after "moon." Now look at the third example. It reads, good—bad; big—.....There is good and bad and big and .....? (Class answers.) So what word should be written after "big?" All of you write "little" (or "small") after "big." Now go through all the other twenty lists in just this way, writing on the line after each list the word you need to finish the meaning of the other three. If you come to a list you can't do, skip it and go on.

III. Results

These group tests have been given to 1022 children in the Bloomington public schools; to about 500 pupils in one, two, and three room country schools; to 200 cases in the State School for Feebleminded Youth at Ft. Wayne; to a special class of 23 children possessing superior intelligence and to two control groups in Louisville, Ky.; to 178 colored children; to the entire school population at Jeffersonville, Indiana; 769 cases; to all school children below the 11th grade in Bedford, Indiana, 1009 cases; to the fifth grade pupils at Logansport, 277 cases; and to the sixth grade pupils at Richmond, Indiana, 308 cases. The effort has been to obtain data from as great a variety of cases and localities as possible to give a wide basis for the study of the various sociological and educational problems mentioned above.[8] The writers have been particularly interested in analysis by test, for race, sex, and environmental variations.

The results of these special studies will be presented and discussed in later papers. The present article will give only norms by age and by grade, obtained from the 1022 Bloomington children, plus such other material from the further studies as is necessary for an interpretation of these results. The Bloomington norms are presented in Table I.

[8] The writers wish at the outset to express their obligations to the school officials and teachers, who have co-operated in the study, to Dr. George S. Bliss, Superintendent of the State School for Feebleminded Youth, and to Miss Henrietta V. Race, in charge of the psychological work in the schools of Louisville, Ky. Without their co-operation and interest this study could not have been made.

TABLE I

GROUP POINT SCALE RESULTS FROM 1022 SCHOOL CHILDREN IN BLOOMINGTON

Age	No. cases	10%	M.	90%	Grade	No. cases	10%	M.	90%
8	53	37	63	87	3	116	28	52	81
9	92	40	71	108	4	99	42	65	94
10	96	44	93	124	5	96	73	98	114
11	114	62	105	141	6	108	88	110	136
12	117	82	116	148	7	123	103	124	146
13	111	95	127	155	8	122	112	133	156
14	133	101	138	164	I	123	127	146	167
15	104	111	149	167	II	97	135	155	165
16	89	129	152	169	III	82	141	156	173
17	80	129	152	169	IV	56	153	162	171
	986*					1022			

* Below eight and above seventeen, there were too few cases at each age to give a reliable norm. These cases have, therefore, been omitted from the statement of results by age, though of course included in the figures by grade.

The all important question now arises as to the reliability of the scale, and the significance, sociological and educational, of the ratings; the prime advantage (for the psychologists) in a combination of a psychological and a sociological survey was expected to appear in the possibility of obtaining interpretations of the mental measurements in terms of a large mass of educational and sociological data. From the data so far gathered the following facts have been selected as most pertinent to these questions.

IV. THE VALIDATION OF THE SCALE

An indication of the significance of these tentative norms has been obtained from the following five sources.

1. The reliability of the group tests to indicate the extreme cases has been checked up by Binet examinations. Throughout the survey the Stanford-Binet scale has been used as the final basis for making a psychological diagnosis of feeble-mindedness. The use of the Binet scale has been most systematic in two Bloomington graded schools. In these schools 21 cases were found with an I.Q. of 76 or below, who had also been examined by the group scale. They averaged at the 4 percentile of their age by the group tests; the highest scores made by these cases were at the 8 percentile. In those

two schools a total of 317 children had been given the group tests. Of these 68, or 22 per cent, were given Binet examinations in an effort to discover all low grade cases. Teachers' estimates, age-grade status and group scale ratings were all used in selecting the cases to be examined by the Binet scale, and the writers feel that errors made by the group scale in the rating of the low grade cases should have been discovered if they had occurred. On the basis of these results, the writers have been using the 10 percentiles as a limit above which a search for mental defectives need not go. The comparative reliability of this method may be indicated by the fact that two cases with I.Q.s below 70 were found which had not been included by their teachers in lists of the poorest fifth of the class.

According to Terman the group of cases having I.Q.'s 76 or below constitutes 3 per cent of the total distribution of abilities. A similar effort was made to discover supernormal children, the group which, according to Terman, makes up the upper three per cent. The Binet work with these brilliant children was not so systematic as was the search for mental defectives. Group test scores are available, however, from 30 children who gave an I. Q. rating of 125 or above. The average standing of this group as determined by the Group tests is roughly at the 98 percentile. For the eight-year-olds there were two, who fell below the upper ten percentile, one at the 51 percentile, the other at the 88 percentile. Above this age all are included at the 85 percentile or above. These children were all ten or younger; with older children the accuracy would probably be greater.

2. The purpose of the county survey was to determine—not the number of children with an I.Q. below 70—but the number of mental defectives of institutional grade. The most direct way to obtain data giving an indication as to the reliability of the group scale for this purpose would, therefore, seem to be to survey with the Group Scale an institution for the feeble-minded. As part of all the standardization of the scale the writers, therefore, gave the tests to all the cases in the State Institution for Feeble-minded Youth sufficiently literate to take the examination. Similarly, not merely children with an I.Q. above 125, but superior children who had proven themselves capable of profiting by intensive special class treatment in a "gifted" class were needed to give an indication as to the reliability of the scale to select brilliant children. A class of brilliant children at Louisville were there-

fore examined.[9] The "School for Feeble-minded Youth" has 416 cases 18 years of age or below. Of these, only three were able to make a rating above the lowest ten percentile of the school children of the same ages. One of these three has a Stanford Binet I.Q. rating of 78, for the other two no Binet ratings are available. Only five show a group scale rating above the lower five percentile. The institutional cases, then, are clearly marked off from the group of school children. At the other extreme, the Louisville group of gifted children made scores averaging at the 98 percentile of the Bloomington norms. This is, therefore, also a distinct group which may readily be selected or differentiated by the group tests.

3. The age-grade status of a child is, at least for all except the first grade or two, the most definite single statement which the school can give regarding his mental ability. The age-grade status has been worked out for all the children examined by the group scale in Bloomington, six to eight being considered normal for the 1B grade, and so on up. The results on this point may again be summarized briefly by saying that the 143 retards in the ages from 10 through 16 average 70 points lower on their group test score than the 124 accelerates of the same ages, or to put it another way, the differences average 55 per cent of the medians at each age. In the entire number of cases (986) from 8 through 16, there are only 10 accelerates whose group test score was below the median for their age and only five retards whose score was above the median for their age.

4. It has not been possible to obtain correlations of teachers' estimates with the group scale ratings for all the children tested. Such correlations have, however, been worked out for the children in one grammar school in Bloomington and for all the sixth grade children in another system who were examined by the group scale. These rankings by the teachers were in both instances called for in the last month of school, after the teachers had had an entire school year in which to become acquainted with the children's abilities. The correlation of group test rank with teachers' rank, averages .65 for the 131 children of the Bloomington graded schools, and for the 309 sixth grade children is .63 (Spearman "foot rule").

5. It might be argued from the last two paragraphs that the tests were rather tests of achievement or of school ability than of general intelligence. Data of great interest in this

[9] Henrietta V. Race, A Study of a Class of Children of Superior Intelligence, *Journal of Educational Psychology*, vol. 9, 1918, pp. 91-97.

connection have been obtained from two other school systems recently surveyed by the scale. In one 1009 children were examined, in the other 769, so that the results are adequate for comparative purposes. The three cities are largely similar in make-up of population; in all the stock is almost entirely native born, and with this large number of cases the averages would be expected to be about the same by age if the scale was a measure of general intelligence. But the school systems differ considerably. The results obtained by the group tests by age show an average difference for the medians of less than 2 points in these cities, whereas the differences by grade average 13 points. If the tests were a measure of the results of schooling rather than general intelligence the norms would be more similar for the grades than the age. These last results, the writers feel, are a striking vindication of the tests as tests of general intelligence, and as largely free from the influence of special training.

Summary

The paper may be summarized briefly as follows:

1. The group point scale is an examination, composed of ten tests each of twenty items, each test being applicable from the third grade through high school, or from eight to about sixteen years.

2. The examination is especially adapted, in the nature of the individual tests, the variety of the tests, and particularly in the close relationship and co-operation between examiner and class, for work with grade school children. It gives a much more adequate mental rating for such children than a more artificial and set examination could give.

3. The examination is carefully planned, in both detail and organization, for convenience in practical work and in research.

4. The ratings obtained show, when correlated with other independent sociological and educational evidence, a high degree of reliability as measures of general intelligence.

THE VALUE OF RELEVANCY IN ADVERTISEMENT ILLUSTRATIONS[1]

By Herbert R. Laslett, University of Kansas

If relevancy be defined as the portrayal (in the illustration of the advertisement) of the ultimate usefulness of the article advertised, how closely should relevancy be adhered to in the average non-trade, non-professional magazine? This paper contains the data obtained in an effort to answer scientifically this question.

Objectively this question is of importance because it bears upon the construction of advertisements to the end that they may be brought to a high standard of efficiency (which means that they are economical in terms of money expended and money received resultant from an original outlay), and it is of importance therefore to the advertiser, the publisher, and the reader. Subjectively this matter bears upon the average amount of subject-matter retained out of the advertising aggregate seen by the reader of these so-called popular magazines.

Psychologically it bears relation to the number of steps of progressive thinking that the average reader will make, or to the duration of the effort that he will make, to connect an article as shown in a magazine advertisement with himself; or, in other words, relevancy in illustrations is closely related to the pulling power of an advertisement.

In making these tests the main dependence for material was placed upon two copies of the *Saturday Evening Post*,—one of the issue of December 2, 1916 and the other of the issue of March 24, 1917. The bindings of these magazines were cut, and full-page advertisements selected from other issues were inserted in their proper page places, that is, the selected advertisement was inserted after page 64 of the test magazine if it was numbered 65 in the magazine from which it was taken. In this way no cue to the insertion of any pages was given to the subjects. It is needless to say that the inserted advertisements were chosen because they were clearly relevant or irrelevant, as the case may be. The pages of the new magazines were then fastened together with heavy spring-clips.

[1] From the Psychological Laboratory, University of Kansas.

The advertisements with relevant illustrations that were chosen as test advertisements showed the article that they represented in actual use by some one evidently of the same habits as the majority of the people who would see the advertisement; for example, the young man in the Pullman car drying his hands on a Scottissue towel, or the Black Cat stockings that looked to be sound and durable in spite of the hard usage given them by the healthy youngsters on their roller skates. The other kind may be illustrated by such examples as the Gold Medal Flour advertisement showing a clown balancing upon his nose a rectangular object that proved, after some study, to be a baking pan, and beneath it the words 'A Well Balanced Baking,' or the Encyclopedia Brittanica advertisement showing the setting sun surmounted by the words "after 7:30 June 3rd." The text that followed this illustration showed eventually that after June 3rd the encyclopædia could be bought only for a sum that was a large increase over the price for which it was then selling. The advertisements selected for one magazine were:

1 Society Brand Clothes, March 24, 1917.
2 Lyon's Tooth Powder, same issue.
3 Westinghouse Fans, July 8, 1916.
4 Scottissue Towels, May 27, 1916.
5 Goodyearite Packing, May 27, 1916.
6 Certainteed Roofing, September 2, 1916.
7 Wagner Products, June 17, 1916.
8 Holeproof Hosiery, September 4, 1915.
9 Textan Shoe Soles (Goodrich Co.), March 24, 1917.
10 Stewart Auto Products, January 29, 1916.
11 Neolin Shoe Soles (Goodyear), January 29, 1916.
12 Kellogg's Corn Flakes, February 5, 1916.
13 Black Cat Hosiery, August 26, 1916.
14 Stetson Hats, March 24, 1917.
15 Main Belting Co., June 24, 1916.
16 Stewart Warning Signals, June 17, 1916.
17 Florence Oil Stoves, April 22, 1916.
18 Goodyear Rubber Products, January 29, 1916.
19 Encyclopædia Brit. (Sears, Roebuck & Co.), June 3, 1916.
20 Ralston Wheat Foods, March 24, 1917.
21 Hammermill Bond Paper Co., March 24, 1917.
22 Maytag Washer Co., March 24, 1917.
23 Gold Medal Flour, March 24, 1917.
24 Gordon Seat Covers.
25 Pullman Company.
26 Beaverboard Wall Covering.

Students, mostly of the sophomore class, of the University of Kansas were used as subjects; they were members of the elementary psychology laboratory classes, but were unacquainted with the purpose of the experiment. The Pleasant Hour Club—a group of farm women—was also used for the sake of studying the correlation between their interests and those of the students in order that the value of students as subjects for experiments in advertising might be estimated.

In addition, series of advertisements of Packer's Tar Soap, Fairy Soap, and Nujol were used upon various subjects, both in and out of University circles. They were asked to arrange these advertisements in the order of their preferability and attractiveness and then to state, as far as they were able to do so, their reasons for arranging them in a given order. The only requirement made in the selection of these people was that they be unversed in the problems of advertising. Their observations of the meanings of some of the irrelevant advertisements are given later. Their arrangements of the advertisements in the order of preferability coincided with the arrangement for relevancy to the extent that 60 per cent of the advertisements placed in the upper half according to their relevancy were also in the upper half according to their preferability. The exceptions were the 'human interest' pictures of the Fairy Soap, to which in an indirect way a certain amount of relevancy may be attached.

The following method was used in the laboratory: the magazine was given to the various members of the classes as they were found in the laboratory working in pairs. The instructions given to them were that they should have from five to seven minutes to look at the magazine as a whole, that they were not to read the stories, that they were not to talk over the magazine in the laboratory nor later outside of the laboratory, and that for the time being they were to give their whole attention to the magazine. It was thought that in this way the ordinary conditions under which magazines are read by the average reader could be most nearly duplicated. On the second day after the first review of the magazine, it was again given to them to look over as before. On the fifth day after the second review (the next current laboratory period) these students were assembled in the classroom and each given a paper upon which to record, in the first place, the names of all of the advertisements which they could remember. The directions given at this time were that there should be no talking nor assistance to each other, that the article advertised, as gum, together with the trade name, e.g., Spearmint, were to

be written whenever possible. (Spearmint Gum was not in the advertisements included in the magazines.) In the second place those cases were to be mentioned in which either the trade name, as Standard Oil Company, or the article advertised together with enough description of the advertisement could be given to make the identification of the advertisement possible. The more definite recollections given in the first place were treated separately from the less definite ones given in the second place. The recollections of the relevant and irrelevant advertisements were recorded in separate tables.

Practically the same plan was used with the members of the Pleasant Hour Club, except that they saw the magazine but once and wrote down immediately the advertisements remembered.

The results with Magazine 'A' from the seven sections of

TABLE I

Relevant Advertisements (Magazine A)	1st Class	2nd Class[2]
Crisco	10	0
Elgin Watch	26	8
Simmon's Watch Chains	15	11 (a)
Velvet Tobacco	44	4
Welch's Grape Juice	17	5
Western Electric Co	9	4 (b)
Holeproof Hosiery	18	11
Average	20.0	6.1
Irrelevant Advertisements	**1st Class**	**2nd Class**
Brascolite	1	1 (c)
Cadillac	10	0
Encyclopedia Brit	7	2
Hoosier Kitchen Cabinet	5	1
Main Belt Company	0	2
Manuola Player Company	1	0
Maytag Washer Company	0	0
Perfection Auto Heater	0	0
Stewart Speedometer Co	6	2
Southern California (Gen. Publicity)	10	11 (d)
U. S. Rubber Company	11	0
Vim Motor Company	21	0
Saturday Evening Post Adv	4	0 (e)
Average	5.8	1.7

[2] Examples of descriptions of advertisements which are counted in Class 2 because of sufficient definiteness are the following: (a) "A picture of Norma Talmadge and some other actor wearing wrist watch and watch chain;" (b) "Electric sewing machine with woman sewing;" (c) "Do patent laws protect"—a lighting system; (d) "See California," "railroad rates to California," "California—motorists paradise"; (e) "Arthur Brisbane, the highest paid editor in the United States."

students were combined, as there seemed to be no essential differences between them, and these are represented in Table I. The column headed "1st Class" gives the number of times that each advertisement was mentioned in the first place, and the column headed "2nd Class" shows how frequently each advertisement was mentioned in the second place. The corresponding results with Magazine B are shown in Table II.

TABLE II

Relevant Advertisements (Magazine B)	1st Class	2nd Class
Society Brand Clothes	7	3
Lyon's Tooth Powder	2	0
Westinghouse Fans	15	3
Scottissue Towels	1	1
Holeproof Hosiery	9	2 [3]
Kellogg's Corn Flakes	19	2
Black Cat Hosiery	5	2
Florence Oil Stoves	3	1
Ralston's Breakfast Food	8	2
Stetson Hats	3	0
Hammermill Bond Paper	4	0
Textan Shoe Soles	5	2
Average	6.6	1.5
Irrelevant Advertisements	**1st Class**	**2nd Class**
Gold Medal Flour	0	2
Certainteed Roofing	2	2
Goodyearite Packing Rubber	3	0
Wagner Elec. Manufg. Co	0	1
Stewart Auto Products Co	1	1
Neolin Shoe Soles Co	8	1
Main Belt Company	0	0
Stewart Warning Signals	2	1
Goodyear Rubber Products	4	4
Encyclopedia Brit	2	0 [3]
Maytag Washer Company	6	2 [3]
Average	2.5	1.2

TABLE III

Relevant Advertisements (Magazine A)	
1. Crisco	4
2. Elgin Watch	3
3. Simmon's Chains	0
4. Velvet Tobacco	4
5. Welch's Grape Juice	2
6. Western Elec, Sew. Mach. Co	0
7. Holeproof Hosiery	1
Average	2.0

[3] In these cases the advertisements in Magazine B are not the same as those shown in Magazine A.

TABLE III—*Continued*

Relevant Advertisements (Mag zine B)		
1.	Society Brand Clothes	2
2.	Lyon's Tooth Powder	6
3.	Westinghouse Fans	8
4.	Scottissue Towels	3
5.	Holeproof Hosiery	3
6.	Kellogg's Corn Flakes	6
7.	Black Cat Hosiery	4
8.	Florence Oil Stoves	4
9.	Ralston Breakfast Food	4
10.	Stetson Hats	2
11.	Hammermill Bond Paper	0
12.	Textan Shoe Soles	0
	Average	3.5
Irrelevant Advertisements (Magazine A)		
1.	Brascolite	0
2.	Cadillac	0
3.	Encyclopedia Brit	0
4.	Hoosier Kitchen Cabinet	2
5.	Main Belt Co	0
6.	Manuola Player-piano	0
7.	Maytag Washer Co	0
8.	Perfection Auto Heater	0
10.	Southern California (ad.)	0
11.	U. S. Rubber Co	0
12.	Vim Motor Company	2
13.	Saturday Evening Post	1
	Average	0.5
Irrelevant Advertisements (Magazine B)		
1.	Certainteed Roofing	0
2.	Goodyearite Packing Co	0
3.	Stewart Auto Products	0
4.	Neolin Shoe Soles	2
5.	Main Belt Co	0
6.	Stewart Warning Signals	0
7.	Goodyear Rubber Co	0
8.	Encyclopedia Brit	2
9.	Maytag Washer Co	0
10.	Gold Medal Flour	0
	Average	0.4

In the papers of the Pleasant Hour Club there were only recalls of the first class. The results are given in Table III.

By converting the actual frequencies of the preceding tables into percentages we obtain the results as presented in Table IV.

TABLE IV

Relevant	1st Class	2nd Class	Total
Magazine A with students	17	5.6	
Magazine B with students	9.8	2.9	
Magazine A with clubwomen	33	—	
Magazine B with clubwomen	58.2	—	
Total	118.	8.5	126.5
Irrelevant	**1st Class**	**2nd Class**	**Total**
Magazine A with students	5.3	1	
Magazine B with students	3.6	1.9	
Magazine A with clubwomen	0.8	—	
Magazine B with clubwomen	0.6	—	
Total	10.3	2.9	13.2

These results seem to allow of no doubt as to the comparative value of relevancy in the magazine cuts as against

TABLE V

	Apprehension Times	Average for 15 subjects
Relevant Advertisements		
1.	Society Brand Clothes	9.3 seconds
2.	Lyon's Tooth Powder	10.6 "
3.	Westinghouse Fans	10.5 "
4.	Scottissue Towels	8.1 "
5.	Holeproof Hosiery	5.7 "
6.	Kellogg's Corn Flakes	6.8 "
7.	Black Cat Hosiery	6.6 "
8.	Stetson Hats	7.7 "
9.	Florence Oil Stoves	8.8 "
10.	Ralston Wheat Food	4.9 "
11.	Hammermill Bond Paper	15.0 "
12.	Textan Shoe Soles	11.6 "
13.	Gordon Seat Covers	6.3 "
14.	Pullman Company	8.5 "
15.	Beaverboard	10.6 "
	Average	8.73 "
Irrelevant Advertisements		
1.	Certainteed Roofing	26.2 "
2.	Goodyear Packing	22.3 "
3.	Wagner Electric Co	34.2 "
4.	Stewart Products (auto)	22.2 "
5.	Neolin Shoe Soles	9.3 "
6.	Main Belt Company	18.1 "
7.	Stewart Warning Signals	15.5 "
8.	Goodyear Rubber Products	27.0 "
9.	Encyclopedia Brit	19.9 "
10.	Maytag Washer	16.5 "
11.	Gold Medal Flour	22.1 "
	Average	21.25 "

irrelevancy in the illustrations, since nearly ten times as many advertisements with relevant illustrations are recalled as those containing irrelevant illustrations.

As a check upon the validity of the selection of the advertisements as relevant or irrelevant, the advertisements of Magazine B containing both the relevant and irrelevant illustrations were used with a group of fifteen students who were unfamiliar with the tests, and the apprehension-times of these subjects were taken for each advertisement. Apprehension-time was considered the shortest time-interval necessary to elapse in order for the subject to name the article advertised or the company advertising and one point of advantage or superiority of the article mentioned in the text of the advertisement or easily inferrable from it. Table V shows the results of this test.

It will be seen that in only one case was the apprehension-time of an irrelevant advertisement less than the longest apprehension-time of a relevant advertisement, and thus the selection of the advertisements as easy or difficult of understanding was verified in all cases except this one of the Neolin Shoe Soles. A partial explanation of the short time of this advertisement may be the fact that it came after the advertisement of Textan shoe soles more often than not and thus attention directed to composition soles was carried over from the latter to the former advertisement.

Taking up some of the minor phases of the experiment we may consider the position of the selected advertisements within the magazines, the relative frequency of the advertisements, the intensity of the advertisements used, and the occurrence of advertisements by the same firm in both magazines.

In the matter of favorable and unfavorable positions, one of the advertisements was placed immediately preceding the reading matter . . . presumably the best position in the magazine . . . and another was on the back cover. Both were within the median percentiles of number of recalls. The other advertisements were scattered through the advertising sections and varied in number of recall apparently without regard to their positions in the sections.

As regards frequency of appearance of the advertisements, the more common advertisements were not used in our tests. So far as is known to the writer none of the selected advertisements appeared in the magazines commonly read by students during the week of the experiment or the week preceding it, except that a few of the test advertisements were selected from the original issue of the magazine used. The advertisements selected were as nearly equal in frequency as

possible. It is believed now, however, that one reason for the high number of recalls received by the Velvet tobacco advertisement is its relatively greater frequency of appearance, and the credit it gains from the advertising of similar products, such as Prince Albert and Tuxedo.

The intensities of the contrasts of the cuts were as nearly the same as it seemed possible to choose them, with the exception of the irrelevant advertisement of the Vim Motor Company in Magazine A. This advertisement was recalled 22 times out of a total of 76, or almost one-third of all the cases. It is needless to say that the intensity of this advertisement seemed to be greater than that of the other advertisements. As none of these were favored to a similar degree, it would seem that their intensities were nearly equal.

In the matter of placing two advertisements of the same firm in both magazines, there was no notable increase in the number of recalls of the second advertisement over the first. This is significant because it leads to the conclusion that no matter how frequently an advertisement is inserted, if it has little attention value, no benefit will be gained from the second or third insertion if it is not noticed in the first.

In regard to the subjects used, students were used because they were available in the greatest numbers and were as good subjects as could be obtained. The women of the Pleasant Hour Club were used because it has been found that the women do more than half of the family buying, and the articles advertised in the *Saturday Evening Post* and other popular magazines are of the sort where the influence of women would be keenly felt.

In listing the apprehension-times it was evident from the first that students turned much more readily to the advertisements whose general subject matter was in some degree familiar to them, thus evidencing the inertia of attention that advertisements must overcome.

Among the advertisements mentioned by the students were some not found in the magazines. Phoenix Hosiery was mentioned six times because it was mistaken for the Holeproof advertisement. Old Dutch Cleanser was mentioned presumably because its advertisements are nearly always in the *Saturday Evening Post*. Ivory Soap was mentioned three times for probably the same reason. Big Ben clocks, Prince Albert tobacco, Royal Tailoring Company, and Overland cars were likewise mentioned by mistake, as they were not found in the test magazines: this is perhaps due to the constant advertising of these concerns.

To summarize our results: it was found that advertisements containing relevant illustrations were remembered nearly ten times as often as advertisements with irrelevant cuts. In the case of the former kind, the name of the firm or of the article advertised together with one point of the latter's superiority was apprehended from two to three times as quickly as in the case of the irrelevant illustrations. The employment of university students as subjects in psychological tests on advertising is justified, since no significant difference was found between them and a class of women who represent the purchasing public. Other well-known facts of the psychology of advertising, such as the influence of the size of advertisements, of the frequency of their appearance, of the intensity contrast of their illustrations, of the surrounding reading-matter, and the like, were confirmed by our results.

FURTHER COMMUNICATIONS REGARDING "A PLAN FOR THE TECHNICAL TRAINING OF CONSULTING PSYCHOLOGISTS"

Dr. Leta S. Hollingworth, Teachers College, Columbia University, sends the following:

Tentative Suggestions for the Certification of Practicing Psychologists

It is with pleasure that I accept the invitation of *The Journal of Applied Psychology* to participate in the symposium on qualifications for psychological experts. Since my own practical experience has been very largely in the so-called clinical field, I do not doubt that what I have to say will be conditioned to a great extent by that experience.

In the first place, there is distinction among the various fields in which psychologists serve, in spite of the fact that there is much overlapping among these fields. We have educational psychology, industrial psychology, clinical (medical) psychology, etc. Not only are these various fields to be distinguished, but upon reflection it becomes clear that they are at the present moment in different stages of development, both in regard to the preparation obtainable in the universities, and in regard to the actual demand for services to be rendered.

It is my impression that so-called clinical psychology is more advanced in many respects than are the others. Educational psychology, though well established, has devoted itself to teacher-training, rather than to the development of the expert educational psychologist; so that the latter (insofar as he can be differentiated from the clinical psychologist) is among the most recent innovations. Industrial psychology can hardly be said to be taught as yet, even in first rate university departments (Carnegie Institute for Technology being a notable exception). On the other hand, preparation for clinical psychology is now being offered in several of the large universities; the demand for psychologists in this field is steady and increasing; a national association of those already in the field has been formed; and some of the states have even set legal standards for the practice of clinical psychology.

This inequality of development in the various branches of applied psychology complicates the matter of certification

of individuals. Certification in the clinical field seems feasible and necessary at this time, whereas certification in the industrial field seems impracticable.

In the present state of affairs, it seems to me that the most workable plan is to certify institutions. Let there be a standing committee of a responsible body, such as The American Psychological Association, to prepare a list of departments of psychology, where prescribed training has been made available. This list should be published annually, and printed in the report of the A. P. A., and in the technical journals, and posted in departments of psychology. Then, for the immediate present, let the certified institutions certify individuals, by conferring upon qualified persons the prescribed diploma.

In this there would, of course, be nothing legally mandatory. Ultimately the legal certification of individuals must be brought about, but in my judgment this will not be practicable until the courses of study have been standardized, and have actually been offered for three or four years at the universities.

As to the various degrees of expertness, and the recognition of each by means of a suitable diploma, Dr. Geissler in his initial article on the subject, distinguished three possible levels of skill. It seems to me that but one level of fitness should be certified, namely the fitness of an individual who will be an expert psychologist, with all the knowledge necessary (so far as knowledge is available) for the direction and control of human behavior. This person should earn and receive a doctor's degree in psychology, and should be given a professional diploma as Psychologist.

Many will hold that the grade of attainment represented by the master's degree (a college course and one year of specialization beyond), should be distinguished and certified. At times it seems to me that this should be done, and that some such title as Assistant Psychologist should be conferred; yet the more closely I consider the question the more convincing seem to me the arguments against certifying an inferior grade of training. Will not such certification tend to create a supply of certified inferior and hence inexpensive service, the inferiority of which will be condoned in many quarters for the sake of the inexpensiveness? Will not the distinction between Psychologist and Assistant Psychologist be too vague to function, especially since one costs much more than the other? And will not the whole purpose of the attempt at standardization be thus frustrated? For, as I conceive it, the purpose of standardization is twofold, (a) to assure

the best possible quality of service to the public, and (b) to protect those who are able and willing to undertake thorough preparation against the competition of those who are unable or unwilling to undergo the same training. The accomplishment of the first purpose is inseparably bound up with the accomplishment of the second.

It may be argued that the doctor's degree in psychology is at present awarded largely on the basis of research, in our most completely equipped universities, and hence requires a higher type of intellectual capacity than is necessary for the average practitioner. To me it seems doubtful whether the average successful candidate for the doctor's degree in psychology has more intellectual ability than should be required of one who aspires to be trusted with the direction and control of human behavior. It is at least doubtful that the average ability of those who have won the doctorate in psychology during the decade just passed is higher than that of the graduates of good professional schools, such as schools of medicine and schools of engineering. As fast as really good prospects are established in applied psychology, really good people will come to qualify,—people who are fully capable of earning a doctor's degree. But prospects in applied psychology will not be good, so long as persons of mediocre qualifications occupy the field.

It has been suggested that the traditional divisions of academic training into that for the M. A. and that for the Ph. D. are not very fortunate for the present purposes. The Ph. D. is not in a strict sense a professional degree. There exists at present no degree to indicate the completion of a prescribed professional course in psychology, which does not involve intensive research, but which does involve practice in applications. It has occurred to me that perhaps the situation calls for a new departure, the "invention" of a new degree,—Doctor of Psychology,—which would involve six years of training, including college, with an additional apprenticeship year (instead of research). I think this suggestion is worth considering, as the old Ph. D. is scarcely appropriate to many of the modern uses it is made to serve. Sooner or later it ought to fall away from the sciences through sheer weight of its irrelevancy.

As I have often stated, I am convinced by personal experience and by the experience of colleagues in the field, that it will hardly be possible for applied psychologists to succeed (in clinical practice at any rate), without the doctor's degree. The reasons why this is so probably go back, in the last

analysis, to the fact that the doctor's degree has come to signify adequate skill in him who presumes to direct human welfare. Thus competing professions can and do play in many subtle ways upon the lack of a professional title, to the detriment of the psychologist's legitimate work and service. Furthermore, the general public is disinclined to accept the advice of one who lacks the title of doctor in his field. Thus the usefulness of the psychologist is materially impaired, in cases where he is not qualified with the doctor's degree. These are phases of social psychology which it is necessary to admit, in considering the matter of certification. To ignore them would be to betray ineptitude as an applied psychologist at the very outset. Either we can fall in with the social habit, or dedicate ourselves to a long and tedious process of reforming it.

This emphasis upon the importance of formal titles, certificates, degrees, etc., does not, I find, impress the academic psychologists, who have not personally experienced the limitations upon usefulness resulting from the lack of a "suitable" title out in the practical field. Thus they are inclined to urge that certification is a relatively insignificant matter, and scarcely worthy of dignified discussion. It seems to them that the only really important consideration is that the instruction shall be of first rate quality. To them it is important that the professional teacher of psychology should have the doctor's degree, but unimportant that the practical psychologist should have it. They feel, somehow, that it probably requires less training and ability actually to direct and control human behavior, than to teach how to direct and control it.

Here we see the difference in viewpoint between the pure scientist and the practitioner. This divergence is inevitable; and it is only to be expected that the majority of psychologists, whose interests are mainly in teaching and research, will not be much moved by the subject which we are here considering, *i.e.*, certificates for practitioners. The adequate solution of the problem is, nevertheless, essential to the progress of practical psychology.

Summary of Suggestions

1. Legal certification of individuals will ultimately be necessary, but for the immediate present is scarcely feasible, owing to the unstandardized condition of curricula, and the inequality of development in the various branches of applied psychology. Standardization of curricula must *precede* legal certification of individuals.

2. For the present, institutions should be certified. Lists of certified institutions should be published. These institutions should be charged, for the time being, with the certification of individuals, by conferring upon qualified persons the prescribed diploma.

3. Only one grade of professional qualifications should be recognized by formal certification: persons who earn the doctor's degree, specializing in psychology as prescribed, should receive a professional diploma carrying the title, Psychologist.

4. The suggestion is worth considering as to whether the situation does not call for an innovation,—the creation of a new professional degree, Doctor of Psychology.

Professor S. C. Kohs, of Reed College, writes as follows:

A Word Regarding Plans for the Training of Psychologists

If psychological practice is to become a respectably established institution, then the question of preparation and licensing of psychological practitioners becomes a matter of extreme importance. If the issue is dodged now, psychology will have to face it in some aggravated form later on.

The American Medical Association has for years exercised careful scrunity over medical education in this country. This supervision has meant immeasurable benefit to the medical profession and to society. Practically every state specifies clearly the grade of the college, as assigned by the American Medical Association, from which prospective physicians may be accepted. Recently a national examining board was established and two national examinations have thus far been held. But these conditions have been the result of years of active and bitterly opposed propaganda. It seems reasonable to expect that the practice of psychology will pass through a somewhat similar evolution. But the American Psychological Association, profiting by the experience of the medical organization, can attain the same influence in its field with a considerably smaller expenditure of effort if active measures are taken before quackery obtains a substantial foothold. There should be a standing committee of the American Psychological Association which should set standards of training for the various types and grades of applied psychology: clinical, educational and vocational, and which should act as a national examining board, granting degrees or licenses to properly qualified individuals. I think it would prove unwise to

delegate this power to individual college or university departments, as has been suggested.

A symposium on this subject at the present time is most opportune. When the war is over psychology, together with all our other sciences, will be called upon to contribute its maximum toward social reconstruction. It must stand ready to perform this task respectably and with credit.

BOOK REVIEWS

Osias L. Schwarz. *General Types of Superior Men.* With a preface by Jack London, and an introductory letter by Max Nordau. Richard G. Badger, Boston, 1916, p. 435.

The book contains ten chapters which may well be grouped into six divisions as follows: (1) Ch. I, Definition, General Characteristics of Genius and Talent; Ch. II, Origin and Conditions; (2) Ch. III, Types of Superior Men, Intellectual Hierarchy; (3) Ch. IV, Creative Life, Ch. V, Affective Life, Ch. VI, Striving Life; (4) Ch. VII, Influence upon the Masses; (5) Ch. VIII, Appreciation; (6) Ch. IX, Normality and Abnormality.

In the first chapter the author gives a rather extensive characterization of the genius, the talented and the philistine individual. In this he points out the characteristic memory imitation, verbosity, impressionability, mental harmony, affection and volition which the genius possesses. In the treatment of the heredity and variability of the genius it becomes difficult for one, in the light of present biological principles, to accept some of the unique theories of the author. On page 85 he states: "To produce a genius, the qualitatively similar characters of the parents must be added algebraically; a geometrical addition gives birth to common mortals and talented men."

Chapter II shows the value to society of the philistine group, but the importance of the genius to society is kept in the foreground through the whole book. In connection with this some of the forces, as pain, poverty, etc., which aid or suppress the genius, are treated very well. The high intellectual status of the superior group is treated in more detail in chapter III. The fourth chapter, while termed "The Creative Life," is really a further elaboration of chapter I. Chapters V, VI, and VII deal with the affective and striving life and will be of interest to readers of Social Psychology. Chapter VII treats of the vital relation of the talented person to his social environment and his contribution to the group. The mutual relation between the individual and the group receives emphasis in chapter VIII. Chapter IX is somewhat apart from the rest of the book, although the general idea of the author is still apparent. It would not be impossible to omit this chapter, yet it will be of some interest to the general reader.

The title of the book would be truer to the discussion with the word "Superior" omitted, as all classes are treated, but emphasis is placed on the highest type of person, the genius. With this individual the author compares the talented man and the philistines, or average persons. This discussion is interesting in connection with McDougall's élite group, and *The Great Society* of Wallas. "Philistines differ from geniuses in both aims and abilities. The talented man differs from the genius belonging to the same class more in ability than in aims," p. 16. The author has followed the literary style of Lombroso or Havelock Ellis. Quite often the linguistic style of the author attracts the attention away from the point which he wishes to make. All references to works which he has undoubtedly made use of are omitted. While the reader may not notice this lack of references, one cannot escape the feeling that some of the author's statements without the signs of a quotation are really direct quota-

tions; p. 415-6, for example: "Women as a rule are born philistines: . . . to fall into their hands."

In many places the reader feels that the author did not make use of the most recent and accepted views in biology, sociology, and psychology. ". . . genius . . . can be regarded as a result of accumulation or summation of inherited unconscious tendencies, of inherited cosmical-suggestive impulses," p. 84. "Only those acquired characters are transmitted hereditarily which affect strongly the parent's organism, . . .," p. 84. "In animals not only habits or acquired characters but also actions performed but once may become instinctive or hereditary modes of behavior, . . .," p. 113. "We understand why for women, knowledge, or truth, is still a means to success, and has not yet become an end-in-itself," p. 412.

The author has crowded his statements full of ideas and his sentences almost resemble aphorisms. The book will be of interest to students of social psychology and sociology, and to the layman who wishes a popular treatment of the characteristics of the élite group in comparison with the philistine group.

J. E. Evans.

Lewis M. Terman, Grace Lyman, George Ordahl, Louise Ellison Ordahl, Neva Galbraeth and Wilford Talbert. *The Stanford Revision and Extension of the Binet-Simon Scale for Measuring Intelligence.* Educational Psychology Monographs No. 18. (Edited by Guy Montrose Whipple.) Warwick and York, Inc., Baltimore, 1917, p. 179.

This monograph summarizes the data on which is based Terman's revision and extension of the Binet Scale as published in his *Measurement of Intelligence.* After a "Brief Account of the Stanford Revision and its History" in chapter I the authors discuss in the subsequent seven chapters the following topics: "The Distribution of Intelligence," "The Rate of Growth and the Validity of the I. Q.," "Sex Differences," "The Relation of Intelligence to Social Status," "The Relation of Intelligence to School Success," "The Validity of the Individual Tests," and "Some Considerations Relating to the Formation of an Intelligence Scale." Among the reasons why the authors claim "that the Stanford 1914-1915 data have more than ordinary significance" are: the great number of children, namely 981, varying between 80 and 120 at each age from 6 to 14 years, with somewhat fewer at 5 and 15, the great uniformity and care in the conduct and scoring of the tests, the selecting of children within two months of a birthday, and the elimination of racial differences. Consequently the distribution of intelligence for the ages separately as well as for combined ages as based upon the Intelligence Quotient follows very closely the theoretical (Gaussian) normal frequency curves. The curves show that the distribution of mental ages becomes progressively flattened the older the children. The authors believe that the results of tests repeated on the same children at various intervals as far as they have been made, "support in a general way the hypothesis that the intelligence quotient of a given child tends to remain constant" and that "growth of intelligence comes to a standstill somewhere in the later years of adolescence and that the cessation is gradual rather than sudden." The data on hand also throw doubt upon the common notion that mental development progresses alternately at slower and faster rates. A slight sex-difference in favor of the girls seems to occur between 5 and 14 years of age, and in certain tests sex-differences were unexpectedly well marked. "The median intelligence quotient

for children of the superior social class is about 7 points above, and that of the inferior social class about 7 points below the median intelligence quotient of the average social group." The superiority seems to the authors to be "almost certainly due primarily to superior original endowment," and they base this conclusion upon five supplementary lines of evidence which are fairly convincing. The results also show a very close agreement between the intelligence quotient and the quality of school work as judged by the teachers. The cases of disagreement are mostly due to the teacher's oversight of age differences. As a consequence "superior children are seldom allowed to reap the advantages in school progress, to which their superiority fairly entitles them." The authors point out that a given amount of retardation or acceleration is not equally significant at the different ages, which fact has been most consistently overlooked by many students of the problems of age-grade progress. The last two chapters are of especial importance from the standpoint of the theory of mental testing and intelligence scales. The three criteria for the validity of a test in an intelligence scale are said to be increase in per cent of unselected children that pass it, internal coherency, and reasonably high correlation with intelligence as otherwise estimated. Considering the second of these as the most important criterion, the authors have subjected it to an elaborate statistical treatment and on the basis of it have divided all the tests examined into good, poor and indifferent. Another statistical treatment of results from adults shows that there is no significant influence of school training on the ability to pass most of the tests. The influence of the age-factor is difficult to determine, but the results on the tests involving memory were found to contradict those of Kuhlmann. The last chapter is a defense of the Binet method of testing intelligence against various critics, an exposition of his dynamic conception of intelligence, and a justification of the principles underlying Terman's revision and extension. The last paragraph attempts to prove that the advantages claimed for the Yerkes Point-Scale are questionable, that it has failed to equalize the "points," and that the employment of the intelligence quotient secures for the Binet Scale the advantages of giving partial credit for partial success.

An appendix of 16 pages contains tables giving the percentages that passed each test at each age. These tables might have been made even more valuable by stating in each case the number of subjects tested.

No psychologist, whether favorably or unfavorably disposed towards the methods of mentality testing, should fail to read this monograph, as it is by far the most important recent contribution to the problems of measuring intelligence. The topics treated are also of vital importance to teachers and educational administrators, and a widespread familiarity with this monograph should prevent many misuses of mental tests by persons not sufficiently acquainted with their true nature and significance.

L. R. G.

EDWARD STAFFORD JONES. *The Influence of Age and Experience on Correlations Concerned with Mental Tests.* Educational Psychology Monograph No. 22. (Edited by Guy Montrose Whipple.) Baltimore, Warwick & York, Inc., 1917, p. 89.

The avowed purpose of this monograph, as set forth by the author, is truly stupendous. It is an attempt to give answer to practically all those fundamental problems which confront the practical worker

in the field of mental testing. The author makes an assay at answering the questions involved in the influence of age and experience on test performance, which answers, when correctly given, will tell us what in actuality the nature of potential development is, from which the plotting of the curve of age growth will become a simple matter. The significance of this will be sensed immediately by those who have had work in this field. Then, too, the question of a common factor in intelligence is necessarily implied in this study as well as other queries which the writer makes explicit.

There is a brief historical survey of the literature relative to each of the topics into which the work is divided. While this historical setting reveals no unanimity of opinion, it does enable the reader to get properly orientated for what is to follow. Here emphasis is justly laid on the necessity of knowing the conditions and of having them the same before a correlation is attempted. Also the effect of homogeneity and of heterogeneity within the group, on the coefficient of correlation, is made clear.

This is followed by a section on the administration of the tests used. The tests are described and the method of administering set forth. The arithmetical mean and the standard deviation is given for each test for each of the four years. The degree of correlation of the same test from year to year is indicated with explanations.

In the part dealing specifically with results, Dr. Jones has used the correlation method of attack and has given a various combination of single test with single test; of single test with total-test-average; of total-test-average with total-test-average; and of tests with school year completed. In the last case only partial correlations have been given.

The conclusions are a little disappointing but no more so than would naturally be expected. The problems to be solved are so fundamental in their nature that much investigation will need be done on them. However, considerable light has been thrown on the subject and the way made clear for further work. The specific value of the tests used, during the years covered, as to 'reliability' and as to 'stability' is a point of special merit. The conclusion that development at this time is in *content* rather than in psychological *process* is interesting. Dr. Jones finds no evidence of a common memory factor, nor of a common intelligence quotient. Lastly, the results seem to show that after the elimination of the 'instructions factor' experience tends to increase the correlation coefficient.

The monograph is a carefully done piece of work along lines difficult of attainment and, in addition to the positive results presented, prepares the way for other investigations along similar lines.

Cornell University. L. B. Hoisington.

William A. White. *The Principles of Mental Hygiene.* The Macmillan Company, New York, 1917, p. 323.

This work is a discussion of such social problems as insanity, crime, feeblemindedness, etc., from the psychoanalytic standpoint, and not only treats of the various factors which unite to create the asocial classes, but also outlines prophylactic measures. While very concisely written, the volume is comprehensive in its scope, including many social phenomena popularly regarded as outside the field of mental hygiene, as alcoholism, vagrancy, divorce, the woman movement, and other minor aberrant forms of social life. "It is the task of mental hygiene," says Dr. White, "to find less wasteful, more efficient means

for dealing with these problems, and, when found, to urge such measures unceasingly upon those who make and administer our laws and direct the trends of public thought."

In the first chapters is a brief statement of some of the fundamental concepts of psychoanalysis, with the emphasis on the well-known Freudian flight from reality, which is later shown to be a leading motive in the types of conduct causing the social ills under consideration. "The instinct for the familiar—the safety motive" is the general term which is used to comprise such mental reactions as ambivalence and projection of emotions, the hysterical conversion downward from the psychic to the physical level, and other defence mechanisms. The genetic viewpoint is stressed throughout. "First of all, the great fact, it seems to me, which has always to be borne in mind, is the fact that our psyche bears the record of its hundreds of thousands of years' development within itself as truly as does our body. . . . This is the historical past of the psyche, the unconscious, it has been called, because its content, while a part of the psyche, is still not in consciousness."

The application of these general considerations to the specific problems of mental hygiene is, in some instances, unique, and in almost every case there are at least one or two significant suggestions. The discussion of the social attitude toward the criminal and the plan for a reform of the penal system is worthy of mention in this respect. The criminal himself has long been disregarded by society, and only the crime has been considered. It is the emotional reaction to the act,—the hatred of the crime,—which, projected upon the criminal, has been the unconscious motivation behind our stringent penal laws, which punish, but do not prevent repetition of the deed. If we are to treat this whole problem in a way leading to social efficiency, we must recognize and control this projection mechanism, and study the criminal with a view to finding and remedying the causes of his conduct. Instead of hard and fast rules for the treatment of each offense, the action toward the criminal must be modified in accordance with the findings of this searching analysis, which should determine whether he is a menace to society and must be imprisoned, or is a hopeful subject for more lenient reformatory efforts. Even those who are condemned, however, must enter a wholly different type of penal institution from that now in existence. The prison of the future will attempt to be constructive rather than destructive; to teach the prisoner a means of reaction at a higher social level instead of wreaking the vengeance of society upon him and creating in him an equal hatred which deepens his antisocial attitude.

In like manner, the treatment of the insane and of other pathological classes is outlined, with pertinent suggestions as to ways and means of prophylaxis. In one or two cases, the author departs radically from the generally accepted scientific attitude, and boldly states a wholly different point of view. In regard to the solution of the problem of mental deficiency, for example, he vigorously opposes the Eugenist plan of sterilization on the ground that it is based on an exaggerated statement of the excessive procreation of the unfit, and is a method utterly unsuited to a humane and sympathetic social organization. That the latter consideration is the real reason for his opposition to a solution which is increasingly advocated by science, is obvious from his own statement of his position: "I feel very much toward the question of sterilization as I do toward the proposition to chloroform all the insane and criminals. The dependents are the burdens which the efficient have to bear and become efficient in

bearing. The pain and suffering they cause have 'forward ends' which make for a better and more humane society. Chloroform might be a solution, but I, for one, would not like to live in a society which adopted it."

The book is an excellent review of the pathological phenomena of present civilization from the sociological and psychoanalytic standpoints, and should prove valuable in spreading a broad general knowledge of the whole mental hygiene movement.

PHYLLIS BLANCHARD.

MAXIMILIAN P. E. GROSZMANN. *The Exceptional Child.* Containing a Medical Symposium with Contributions from a Number of Eminent Specialists. Charles Scribner's Sons, New York, 1917, p. 764.

The author uses the word "exceptional" in its broadest sense. "The purpose of the book is to give a perspective of the entire situation, and to suggest ways and means of coping with the problem in its various aspects." The first part deals with the problem of the individual child, the second part discusses the problem of clinical research and diagnosis, and the third part takes up the problems of prevention, adjustment, and organization. The author estimates that of the twenty-four million children of school age in the United States about six million, or twenty-five per cent, are healthy normal, while about twice this number "suffer from easily removable difficulties, including physical ailments." Of the remaining twenty-five per cent, eighteen per cent include "the exceptionally bright, the nervous, the difficult, the retarded child," five per cent include "the blind, deaf, crippled, arrested, economically submerged, and primitive groups," and the remaining two per cent or 480,000 include "the moral perverts and imbeciles, the feeble-minded, insane, etc." The author has somewhat modified the classification of types of children which he had proposed some years ago, but he still retains the three main classes of normal, subnormal and abnormal children, and clearly defines or describes each type. He divides the exceptionally bright children into four groups; "the *first group* consists of *children endowed with a good memory;* the *second group* comprises *those whose physical and mental growth is generally more rapid* than that of an ordinary child without pathological precocity; the *third group* consists of children of *one-sided development,* i. e., having one faculty, or group of related faculties, developed out of proportion to the other faculties; the *fourth group* is composed of those children in which *special or general excellency is associated with neuropathic and psychopathic tension.*" It is not at all clear to the reviewer why the first group should be set off from the third group. The author says: "the other three types involve intellectual faculties of an unusual character" (p. 107); evidently memory, in the author's view, is not an intellectual faculty In the chapter on the feeble-minded group (ch. 9, pp. 159-184) the author criticizes adversely the diagnosis of such cases by the Binet Tests and offers several valuable precautions to be employed in determining the mental status of a child. Concerning the efforts of standardization our author says: "the science of child testing is so very young yet that it would be disastrous if we should allow ourselves to be guided by a more or less mechanical scale, in placing a certain mental manifestation in a certain definite place of quantitative value, and judging a child accordingly. We may have to revise our standards continually on the bases of further experience. It is for this reason that we must use any kind of tests simply as systema-

tized methods of approach and otherwise apply with fairness and common sense our own standards of experience and judgment" (p. 252).

The second part presents a rather lengthy discussion of the tests employed in the study of exceptional children with a strong emphasis upon the author's own methods of clinical treatment. Here the point of view of the surveyor has rather been lost sight of and frequently the lay reader is overwhelmed by the mass of technical details. On the whole the author's views are very sane and his criticisms of the Binet tests are made to the point. In the third main part, however, the author returns to his earlier perspective viewpoint and discusses such topics as legal provisions for various types of exceptional children, eugenic considerations, home life and home education, school problems, medical inspection, ungraded and special classes, institutional care, the sanatorium school, and the training of special teachers.

Appendix I is a discussion of "The City and her Boys" by Albert B. Hines of New York City. Appendix II is called "A Medical Symposium," occupying pages 562 to 706, and consists of twenty-five contributions of varying length by men like E. H. Arnold of New Haven, C. Ward Crampton, New York, Abraham Jacobs, New York, Howard A. Knox of Ellis Island, E. E. Southard, Boston, Ira S. Wile, New York, Tom A. Williams, Washington, D. C., Thomas D. Wood, New York, and others. In Appendix III are detailed first and second year data of P. E. G., and Appendix IV gives Specimens of Reports on Children Examined. A bibliography of nearly thirty pages concludes the work.

The author's style is lucid and non-technical. An especially attractive feature is the use of cases as illustrative material, while the sixty-three pictorial illustrations add further value to the text. The book may be recommended to all who desire an authoritative and comprehensive view of the numerous problems arising in connection with the exceptional child. L. R. G.

The following publications have been received:[1]

CHARLES HUBBARD JUDD. *Introduction to the Scientific Study of Education.* Ginn and Company, Boston, 1918.

J. E. W. WALLIN. *The Psycho-Educational Clinic and Special Schools.* Excerpt from Annual Report on St. Louis Public Schools, 1916-17, pp. 159-192.

Carry On, A Magazine on the Reconstruction of Disabled Soldiers and Sailors. Edited by the Office of the Surgeon General, U. S. Army. Published by the American Red Cross, 311 Fourth Avenue, New York City, vol. 1, No. 1, June 1918, pp. 1-32.

The Ohio State Institution Journal. Edited by Frank B. O'Bleness. Published by the Ohio Board of Administration, Columbus, vol. 1, No. 1, June 1918, pp. 1-84.

The Porto Rico School Review. San Juan, Porto Rico, vol. 2, No. 6, June 1918.

Report of the Commission on Military Training and Instruction in High Schools to the New Jersey Legislature, Session 1917. Reprinted by the American Union Against Militarism, Washington, D. C., May 1918, pp. 1-15.

[1] Mention here does not preclude further comment.

NOTES

The Ohio Bureau of Juvenile Research, the first state bureau of its kind in the United States, has recently been established on a permanent basis by the Board of Administration. The position of Director of the Bureau has been accepted by Dr. Henry H. Goddard, formerly Director of the Department of Research at the Vineland Training School for Feeble-minded. He will be assisted by Dr. Florence Mateer and Miss Lucile A. Boylan. The Bureau will also employ several physicians, psycho-clinicians, teachers, field-workers, and caretakers, and will closely co-operate with the Department of Psychology at Ohio State University, with the Juvenile Court, and with the Ohio Institution for Feeble-minded. The Bureau was authorized by the State Legislature in 1913 and began its work July 1st, 1914, under the Directorship of Dr. Thomas H. Haynes; but until last year no provision had been made for housing it. Last year the sum of $100,000 was appropriated for buildings which are at present near completion. The functions of the Bureau are two: (1) to study, diagnose, and recommend treatment or proper institution for such cases as are sent in by the juvenile courts of Ohio, and (2) to study the causes of dependency and delinquency. The methods to be employed will be largely determined by the material to be studied, and will include besides the usual mental and physical examinations such more extensive and elaborate methods as X-ray examinations, physiological studies of digestion, secretion, excretion, and of the endocrine system and whatever else may be suspected of contributing to the causes of delinquency.

The Ohio Board of Administration, to which is entrusted the centralized management of all state institutions devoted to the care of the dependent wards of the state, began in June the publication of *The Ohio State Institution Journal*, under the editorship of Frank B. O'Bleness, Executive Clerk. This Journal is devoted "to the exposition of the work of the Ohio Board of Administration and the institutions under its control, in their efforts for the care and improvement of the dependent, defective and delinquent classes: to the publication of the results of researches into conditions responsible for these classes, and the best methods of treatment and prevention: and to the promotion of a complete understanding between the public and the above named agencies in order that both may work in harmony for the welfare of all." The first issue contains a most instructive account of several generations of the "Hickory Family" and its branches, by Miss Mina A. Sessions. This family takes pre-eminence among the defective families of a certain county surveyed "because of the fecundity of its members, the anti-social nature of their habits and mode of living, their utter dependency and the large amount of inbreeding which promises to perpetuate the defective traits."

The Office of the Surgeon-General, U. S. Army, has recently begun to edit and issue a new periodical, entitled *Carry On, A Magazine on the Reconstruction of Disabled Soldiers and Sailors*, which is published by the American Red Cross, 311 Fourth Avenue, New York City. The first number of volume one appeared in June and contains 32 pages. The Editorial Board consists of Colonel Frank Billings, M. C., N. A., Chairman; Lt.-Col. Casey Wood, M. C., N. A., Editor-

in-Chief; Captain Arthur H. Samuels, S. C., N. A., Assistant Editor; John O'Hara Cosgrave; Herbert Kaufman; Lt.-Col. Harry E. Mock, M. C., N. A.; Douglas C. McMurtrie; and Charles J. Rosebault. The Advisory Board consists of twenty-eight members, among whom we find the names of Major-General William C. Gorgas, Honorable William Howard Taft, Samuel Gompers, President Harry Pratt Judson, Major William James Mayo, Rochester, Minn., Mrs. Mary Roberts Rinehart, Dr. Anna Howard Shaw, and Lt.-Col. William H. Welch, M. C., N. A. The first issue contains among others short articles by Douglas C. McMurtrie on "The High Road to Self-Support;" by Sergeant W. H. Zimmerman, A. E. F., on "Our First Blinded Soldier;" by Captain Arthur H. Samuels, S. C., N. A., on "Reconstructing the Public;" and an unsigned article entitled "The Enemy was Ready, How Germany Made Preparations for her Wounded." The magazine is well illustrated with photographs of various phases of the work on reconstruction.

The Staff of the Division of Physical Reconstruction in the office of the Surgeon-General, U. S. Army, contains, according to *Carry On*, among its members Dr. James E. Russell, Dean of Teachers College, Columbia University, Director of Educational Section, and Major M. E. Haggerty, S. C., N. A., Professor of Psychology, Indiana University.

The following is a partial list of members of the American Psychological Association who are engaged in national service of various kinds, including positions in the line, in the Sanitary Corps, in the Signal Corps, in the Aviation Service, in the Medical Reserve Corps, in the Y. M. C. A. work, as well as in civilian capacity. A complete list would probably show a 25 per cent enrollment in national service.

Abbott, E. Stanley, Major, M. R. C.
Angell, James R.
Arps, George F., Captain, S. C.
Ash, Isaac Emery, Captain, S. C.
Baird, John Wallace
Baldwin, Bird T., Major, S. C.
Basset, G. C., Captain, S. C.
Bentley, Madison, Captain, A. S., Sig. R. C.
Berry, Charles Scott, Captain, S. C.
Bingham, H. C., Lieutenant, S. C.
Bingham, W. V.
Boring, Edwin G., Captain, S. C.
Boswell, Foster P., Lieutenant, S. C.
Bridges, J. W., S. C.
Brigham, Carl C., Lieutenant, Tank Corps.
Burtt, Harold E.
Chapman, James Crosby
Chase, H. W.
Cobb, Percy W., Captain, M. R. C.
Dallenbach, Karl M., Captain, S. C.
Dearborn, George Van Ness, Lieutenant, M. R. C.
Dockeray, F. C.
Dodge, Raymond
Doll, E. A., Lieutenant, S. C.
Dunlap, Knight, Captain, S. C.
Edwards, A. S., Captain, S. C.
Elliott, Richard M., Lieutenant, S. C.
English, Horace B., Lieutenant, S. C.
Ferguson, G. O., Lieutenant, S. C.

Fernberger, Samuel W., Lieutenant, 304th Infantry.
Foster, William S., Captain, S. C.
Franz, Shepherd
Frost, Elliott Park, Lieutenant, S. C.
Haggerty, Melvin E., Major, S. C.
Haines, Thomas H., S. C.
Hall, G. Stanley
Hayes, Joseph W., Captain, S. C.
Henmon, V. A. C., Captain, A. S., Sig. R. C.
Hunter, Walter S., Captain, S. C.
Johnson, H. M.
Jones, Edward S., Lieutenant, S. C.
Kelley, Truman Lee
Kellogg, Chester Elijah, Private, S. C.
Kirby, T. J.
Kitson, Harry Dexter, Lieutenant, Field Artillery.
Metcalf, John T., Lieutenant, S. C.
Moore, Henry T., Lieutenant, S. C.
Morgan, John J. B., Lieutenant, S. C.
Myers, Garry C., Private, S. C.
Paterson, Donald G., Lieutenant, S. C.
Pechstein, Louis A., Lieutenant, S. C.
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Porter, James P., Captain, A. S., Sig. R. C.
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Rich, Gilbert J., Private, S. C.
Rowe, Eugene C., Captain, S. C.
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Russell, James E.
Scott, Walter D.
Seashore, C. E.
Stratton, George M., Captain, A. S., Sig. R. C.
Strong, Edward K., Jr.
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Wembridge, Eleanor Rowland
Wheeler, Raymond Holder, Lieutenant, S. C.
Whipple, G. M.
Witmer, Lightner
Woodworth, R. S.
Yerkes, Robert M., Major, S. C.
Yoakum, Clarence S., Major, S. C.

Will members kindly inform the Managing Editor of any errors or omissions? A list of all psychological workers in national service is planned to appear in our next issue, and in order to make it as complete as possible information about psychologists engaged in national service is solicited.

COMMUNICATION

The following communication has been received:

GENTLEMEN:

In the JOURNAL OF APPLIED PSYCHOLOGY, Vol. II, 1918, No. I, p. 89, you print an article entitled "A Note on Mental Peculiarities as Symptoms in Stuttering." Will you be fair to the stammerers and print the other side of the case?

You will undoubtedly accept Dr. E. W. Scripture's testimony in regard to a fundamental fact as a basis for the discussion. He says, "If the question is asked of a patient in the fright stage, 'Why do you stutter?' he will answer, 'Because I am afraid that I will stutter.'"

Accordingly, there are two elements of the disorder to be considered, namely the fear of stammering, and the convulsive effort.

The fear originates in early childhood, in the period that precedes recollection and when the responsibility is entirely on the child's parents or guardians. Scripture, Blanton, Fletcher and others have explained the origin of that fear. An accident or incident interferes with the child's newly acquired and still unstable automatic speech, to overcome which interference the child makes a conscious speech effort, not realizing that its speech is now beyond the period of conscious direction. This conscious effort, being misdirected, blocks the child's normal speech and gives it an impression of inherent speech difficulty. Its companions laugh at its contortions and make it so uncomfortable that it acquires a fear of stammering, so it continues its efforts to avoid the stammering in order to escape the punishment.

If the child is mentally deficient because it is unable to perceive in infancy that it is impeding its speech, how much more deficient are those adult scientists who were unable to see that fact until Liebmann expressed it as an opinion, only, in 1914, and those scientists who are still unable to see it in 1918?

That the convulsive effort is the impediment and that it is voluntary, no one is excusable for not seeing. Who does not know that when the stammerer desists from the effort his normal speech asserts itself? Why is it that an authority will spend hours trying to demonstrate a mythical impediment when he can prove the real impediment in ten seconds? Let anyone do what the stammerer does —press his lips tightly together, hold his breath, exhaust his breath, press his tongue against his upper teeth or his palate, and so on—and he must see that the misdirected effort blocks the normal speech. To reject that evident impediment in search of another is as inadmissible and unscientific as to reject mutual attraction in search of an unknown cause of gravitation.

The child acquires this unfortunate habit of interfering with his speech. Society forces him to continue it. Parents make him talk on the principle that by talking he will overcome his fear; teachers make him stand up before a class and exhibit his infirmity, intensifying his affliction and infecting other pupils with it; employers expect the stammerer to conform to speech conventions injurious to him; even the agencies represented to benefit him—the stammering schools, clinics, and so on—teach him the breathing and articulatory exercises which Liebmann, Thorpe and innumerable subjects of those treatments have testified to result in intensified stammering outside the environ-

ment of the cure. This unjust and cruel treatment of the stammerer accounts for all his peculiarities, to wit:

"*Brevity—short answers and short sentences.*" Under conditions of special embarrassment he has had difficulty with certain sounds, so he fears those sounds and consequently stammers on them. In long speeches he would surely encounter some of them and consequently encounter difficulty, so he is brief.

"*Sensitiveness.*" He has been ridiculed and pointed out as a defective. He sees people watching him to witness his next contortion. He is shunned by people who find his affliction distressing or dangerous. He is misunderstood because he can not express himself and because he is judged by standards that are unjust to him. Who among his critics—rational critics—would not be sensitive under those conditions?

"*Self-consciousness.*" What makes self-consciousness but undue attention? Society is to blame for that: not the stammerer. The ticket-agent snaps at him, "Well, what do you want?" and the line of travelers stares at him. The people in the trolley car stare over their papers at him as he tries to ask for his transfer. Society makes him self-conscious and then calls him defective because he is what they have made him.

"*Undue speed in speech.*" The beginning of an utterance is generally the most difficult part for the stammerer; so, when he gets his normal speech going he tries to keep it going. He is merely endeavoring to avoid his impediment in order to avoid humiliation.

"*Uninhibited speech.*" Many authorities give inhibition as the stammerer's trouble. Comment may wait until agreement on the subject is reached.

"*Confusion of thoughts.*" Anyone may be called on to speak before his thoughts are collected and in that circumstance the stammerer's difficulty is enhanced because to the doubt of speech ability is added the doubt of what to say. Ordinarily, however, the stammerer's thoughts are clear, before he encounters difficulty; for he has formulated them sometimes days, weeks or months ahead. But when he encounters difficulty he must think quickly in order to avoid it. If he can not think quickly enough he becomes confused, not as to what he wants to express but as to suitable words which he is able to utter. If he fails, his confusion is due to the humiliation, past or present, which society accords him.

"*Early and quick onset of fatigue in mental processes.*" Yes. The mental labor of circumventing the memories of thousands of humiliating speech failures is prodigious, and therefore exhausting. That is one of the many reasons why school children should be excused from oral work. The mental effort which should be spent on the acquisition of an education is spent in plans to circumvent the recitation-room torture.

"*Unsociability.*" Society—not the stammerer. One of his great, unsatisfied longings is for understanding and sympathetic society.

"*Taciturnity.*" Yes, especially in adult life. Forced to form and reform the anticipated expression of his ideas, he abandons much of the useless and unimportant. Realizing that the childhood care which would have saved him from a life of suffering has been kept from him by an impossible barrier of speculation, he does not feel affection for those persons or agencies which sacrifice the happiness of hundreds of thousands of human lives for a little notoriety or a few paltry fees.

"*Despondency.*" Melancholia and suicide, too.
"*Reticence.*" Retention of what can not be uttered.
"*Self-repression.*" Without the "self." Excepting the black slaves, and not excepting either the white slaves or the factory children, there is probably no other great class (1,000,000, in this country) so oppressed as the stammerers. The deaf, the lame, the blind, the sick, the impoverished, the wage earner—every such class has agencies and influences working for it. The stammerers have no organization, no publication. The limited portion of the educational, scientific and medical press which considers the subject is devoted almost exclusively to disease theories of the disorder and to the mythical cure and is practically closed to prevention and early correction. The private stammering-schools have been justly and repeatedly condemned, yet their methods are adopted in the public schools. Even the speech clinics practice the injurious treatments. The general press excludes the beneficial information about stammering because it is not of general interest, but prints the harmful sensations because they are of general interest. The innumerable agencies for the protection of the child are deaf to the pleas of the little stammerer, and by their apathy maintain the conditions which force that child into what Dr. Scripture calls a living death.

Will you do the stammerer the scant justice of printing his view that the charge of "Mental Peculiarities"—and some other peculiarities—belongs elsewhere.

Sincerely,

ERNEST TOMPKINS.

Directory of American Psychological Periodicals

American Journal of Psychology—Worcester, Mass.: Florence Chandler.
Subscription $5. 600 pages annually. Edited by G. Stanley Hall.
Quarterly. General and experimental psychology. Founded 1887.

Pedagogical Seminary—Worcester, Mass.: Florence Chandler.
Subscription $5. 575 pages annually. Edited by G. Stanley Hall.
Quarterly. Pedagogy and educational psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company.
Subscription (with Psychological Bulletin) $6. 480 pages annually.
Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company.
Subscription $3.25. 480 pages annually. Psychological literature.
Monthly. Founded 1904. Edited by Shepherd I. Franz.

Psychological Monographs—Princeton, N. J.: Psychological Review Company.
Subscription $4 per vol. 500 pages. Founded 1895. Ed. by James R. Angell.
Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company.
Subscription $1.25 200 pages. Founded 1895. Edited by Madison Bentley.
An annual bibliography of psychological literature.

Journal of Philosophy, Psychology and Scientific Methods—New York:
Sub-Station 84. Bi-weekly. 728 pages per volume. Founded 1904.
Subscription $3. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Substation 84, New York: Archives of Psychology.
Subscription $5. 600 pp. ann. Founded 1906. Edited by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.

Journal of Abnormal Psychology—Boston: Richard G. Badger.
Subscription $5. 480 pages annually. Edited by Morton Prince.
Bi-monthly. Founded 1906. Entire field of abnormal psychology.

Psychological Clinic—Philadelphia: Psychological Clinic Press.
Subscription $1.50. 280 pages annually. Edited by Lightner Witmer.
Monthly (9 numbers). Orthogenics, psychology, hygiene. Founded 1907.

Training School Bulletin—Vineland, N. J.: The Training School.
Subscription $1. 160 pages annually. Ed. by E. R. Johnstone. Founded 1904.
Monthly (10 numbers). Psychology and training of defectives.

Journal of Race Development—Worcester, Mass.: Louis N. Wilson.
Subscription $3. 460 pages annually. Founded 1910.
Quarterly. Edited by George H. Blakeslee and G. Stanley Hall.

Journal of Educational Psychology—Baltimore: Warwick & York.
Subscription $3. 600 pages annually. Founded 1910.
Monthly (10 numbers). Managing Editor, J. Carleton Bell.
(Educational Psychology Monographs. Edited by Guy M. Whipple.
Published separately at varying prices. Same publishers.)

Journal of Animal Behavior—Cambridge, Mass.: Emerson Hall.
Subscription $5. 450 pages annually. Founded 1911.
Bi-monthly. Robert M. Yerkes, Managing Editor.

The Behavior Monographs—Cambridge, Mass.: Emerson Hall.
Subscription $5. 450 pages per volume. Edited by John B. Watson.
Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 Tenth St., N. W.
Subscription $5. 500 pages annually. Psychoanalysis.
Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J.: Psychological Review Company. 480 pages annually. Experimental. Founded 1916.
Subscription $3.25 Bi-monthly. Edited by John B. Watson.

Journal of Applied Psychology—Worcester, Mass.: Florence Chandler.
Subscription $4. 400 pages annually. Quarterly. Founded 1917.
Edited by G. Stanley Hall, John Wallace Baird and L. R. Geissler.

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